Fishery Management Report No. 07-60

Kodiak Management Area Herring Fisheries and Stock Status Report to the Alaska Board of Fisheries, 2008

by

Geoff Spalinger

December 2007

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

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Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mideye-to-fork	MEF
mideye-to-tail-fork	METF
standard length	SL
total length	TL

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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KODIAK MANAGEMENT AREA HERRING FISHERIES AND STOCK STATUS REPORT TO THE ALASKA BOARD OF FISHERIES, 2008

by

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December 2007

The Division of Sport Fish Fishery Management Reports series was established in 1989 for the publication of an overview of Division of Sport Fish management activities and goals in a specific geographic area. Since 2004, the Division of Commercial Fisheries has also used the Fishery Management Report series. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Fishery Management Reports are available through the Alaska State Library and on the Internet: http://www.sf.adfg.state.ak.us/statewide/divreports/html/intersearch.cfm. This publication has undergone regional peer review.

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This document should be cited as:
Spalinger G. 2007. Kodiak Management Area herring fisheries and stock status report to the Alaska board of fisheries, 2008. Alaska Department of Fish and Game, Fishery Management Report No. 07-60, Anchorage.

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ABSTRACT

The Kodiak Management Area (KMA) commercial Pacific herring *Clupea pallasi* sac roe fishery extends from April 15 through June 30. From 2005 to 2007, fishermen harvested and average of 2,884 tons from the average preseason guideline harvest level (GHL) of 3,727 tons. The herring sac roe fishery is managed under an allocative harvest strategy that provides approximately 75% of the total Kodiak GHL to seine gear and approximately 25% to gillnet gear. From 2005 to 2007, purse seine harvest averaged 2,686 tons while gillnet harvests averaged 198 tons. The total exvessel value during these years averaged $1,158,908.

In 2005, 3,463 tons of herring were harvested in the sac roe fishery compared to the preseason GHL of 3,475 tons. Purse seine fishermen harvested 2,932 tons compared to their preseason GHL of 2,625 tons. Gillnet fishermen harvested 531 tons compared to their preseason GHL of 850 tons. The estimated total exvessel value of the 2005 sac roe herring fishery was $1,731,500.

In 2006, 2,643 tons of herring were harvested in the sac roe fishery compared to the preseason GHL of 3,705 tons. Purse seine fishermen harvested 2,617 tons compared to their preseason GHL of 2,745 tons. Gillnet fishermen harvested 26 tons compared to their preseason GHL of 960 tons. The estimated total exvessel value of the 2006 sac roe herring fishery was $726,825.

In 2007, 2,546 tons of herring were harvested in the sac roe fishery compared to the preseason GHL of 4,000 tons. Purse seine fishermen harvested 2,510 tons compared to their preseason GHL of 2,915 tons. Gillnet fishermen harvested 36 tons compared to their preseason GHL of 1,085 tons. The estimated total exvessel value of the 2007 sac roe fishery was $1,018,400.

Herring abundance in the KMA has been increasing and recruitment was strong in several sections during 2007. Samples taken from harvests and test sets throughout the KMA were composed of 2.9% age-2, 11.8% age-3, 13.4% age-4, 9.4% age-5, 46.7% age-6, 5.7% age-7, 4.0% age-8, 2.1% age-9, 2.4% age-10, and less than 1% age-11 and older herring.

The KMA herring food and bait fishery was designated a limited entry fishery in 2001 when five purse seine and four trawl permits were issued. A combine fishery was conducted for the 2001 to 2007 seasons due to the small GHLs when only one permit holder annually harvested fish for the combine. For the 2005 to 2007 seasons there was no allocation of Lower Cook Inlet, Kamishak stock herring allowed in the Shelikof Strait fishery due to concerns for the low biomass estimate and young age classes of Kamishak herring. The food and bait fishery in the Shelikof Strait north of the latitude of Miners point was also closed from 2005 to 2007. In the 2005 food and bait herring fishery, fishermen harvested 168 tons from the Uganik District. In the 2006 food and bait fishery, fishermen harvested 169 tons from the Uganik District. Final numbers from the 2007 season will not be available until the fishery closes on February 28, 2008.

In 2005, subsistence herring harvests of 5,335 pounds were reported from a total of 37 subsistence permits. In 2006, 30 subsistence permits reported harvesting 4,535 pounds. The 2007 subsistence information will not be available until the majority of permits are returned in March of 2008.

Key words: Kodiak, herring, *Clupea pallasi*, sac roe commercial fishery, food and bait commercial fishery, subsistence fishery, GHL, KMA, purse seine gear, gillnet gear, Board of Fish (BOF), FMR.

INTRODUCTION

This report presents historical information concerning the commercial Pacific herring *Clupea pallasi* sac roe, food and bait, and subsistence fisheries in the Kodiak Management Area (KMA), as well as harvest information from the 2005-2007 seasons.

The KMA comprises the waters of the Kodiak Archipelago and that portion of the Alaska Peninsula extending from Cape Douglas southwest to Kilokak Rocks (Figure 1). The archipelago is approximately 250 kilometers (150 miles) long, extending from Shuyak Island in the North, south to the Trinity Islands. The Alaska Peninsula portion of the KMA is about 267 kilometers (160 miles) long and is separated from the archipelago by Shelikof Strait (Figure 1).

The KMA is divided into 13 districts which define geographical areas used in managing both the herring sac roe and food and bait fisheries (Figure 2). For the sac roe fishery, each district is divided into sections that define the spawning area used by herring stocks or a geographical area.

HERRING SAC ROE FISHERY

HISTORICAL PERSPECTIVE (1964 TO 2007)

The commercial herring sac roe fishery began in Kodiak in 1964. From 1964 through 2007 herring sac roe annual harvests averaged 2,011 tons (Table 1; Figure 3). Prior to 1974 the sac roe fishery was unregulated with regard to harvest quotas, gear types, seasons, and fishing periods. Annual harvests, effort levels, herring abundance, prices, and processor interest, fluctuated greatly between 1964 and 1977. Improved market conditions in 1978 prompted increased effort in this fishery when 29 purse seine and 11 gillnet permit holders participated (Manthey et al. 1978). Between 1977 and 1982 the regulatory and management strategy went through a rapid development phase (Manthey et al. 1982). It was during this period that spotter aircraft and tenders were incorporated into the fishery. Regulatory changes focused on gear efficiency, gear conflicts, and gear restrictions (exclusive registration and limited entry).

In the 1990s, closures of the Prince William Sound and Kamishak herring sac roe fisheries and increases in Kodiak herring stocks resulted in increased seine effort in the Kodiak fishery. Many inactive Kodiak seine permits were purchased by "circuit seiners" (herring fishermen who participate in all of Alaska's major herring fisheries from Sitka Sound to Bristol Bay). These circuit seiners had experienced crews and were equipped with high quality sonar electronics, nets, and vessels. With the addition of the circuit seiners to the already efficient local Kodiak seine fleet, effort levels grew with 73 permit holders making landings in 1995 (Table 2). The increased seine effort made controlling harvests difficult. Regulatory changes involved several seine depth reductions and shorter seine fishing periods. Herring prices dropped from a record high of $2,000 per ton in 1996 to a record low of $275 per ton in 2006 (Table 2). With the sharp decline in prices, effort levels also dropped and gillnet gear accounted for a diminishing percent of the total harvest in the late 1990s. In 2000, an allocative harvest strategy, including separate gear areas and harvest opportunity allocations, was established in regulation.

Season Dates

From 1974 through 1978 the season extended from March 1 through June 30 (Manthey 1979). From 1979 through 1981 it was reduced to May 1 through June 30 (Manthey et al. 1979; Manthey et al. 1982). In 1982 the season opening date was changed to April 15 (Manthey et al. 1982). The April 15 to June 30 season dates remain in effect (5 AAC 27.510(a)).

Fishing Periods

Fishing periods from 1964 through 1978, for both gear types, were 24 hours per day, seven days per week (Manthey 1979). In 1979 and 1980 the fishing periods were 48-hour openings followed by 24-hour closures (Manthey et al. 1980). In 1981 the fishing periods were further reduced to 24-hour openings followed by 24-hour closures (noon on odd-numbered days of the month to noon on even-numbered days of the month), which remained in effect through 1994. In 1995 fishing periods were reduced by emergency order (EO) to 10 hour openings from April 21 to May 2, to reduce harvest rates.

Since 1996, gillnet fishing periods were separated from the seine periods and were again set at 24-hour openings followed by 24-hour closures for the duration of the season.

From 1996 through 1999 fishing periods for purse seiners were limited to 13 hours in duration from April 15 through May 4 and beginning on May 5 fishing periods were 24 hours in duration followed

by 24-hour closures for the remainder of the season (Gretsch 2001). In 2000 through 2004, fishing periods in most sections were 12 hours in duration from April 15 through May 7 and 13 hours in duration from May 8 through June 30, with 24-hour closures between periods (Gretsch 2005). In 2002 through 2004 the department used EO authority to reduce fishing period duration in sections that had high effort levels and a large available biomass in order to control harvests (Gretsch 2005). In 2005, Alaska Board of Fisheries (BOF) regulation changes confirmed the EO style of managing certain sections in regulation (5 AAC 27.510(a)).

Gear

Purse seine gear was unrestricted in this fishery through 1973. In 1974, seine gear was limited to 150 fathoms in length and 1,000 meshes in depth. In 1979, gillnet lengths were first limited to a maximum of 300 fathoms with no depth restriction. In 1981, the maximum gear lengths were reduced to 150 fathoms for gillnets and 100 fathoms for purse seines; these regulations remained in effect through 1995. Also, in 1981 trawls and beach seines were eliminated as legal gear for the sac roe fishery. In 1996, purse seine depths were restricted to a maximum of 20 fathoms and gillnet depths were restricted to 230 meshes. In 2000 the seine depth was reduced to a maximum of 18 fathoms stretch measure (5 AAC 27.525(a)).

Gear Levels

Beginning in 1979, combined gear levels increased substantially, reaching a high of 201 units (92 seine and 109 gillnet) in 1980 and 193 units (79 seine and 114 gillnet) in 1981 (Table 2; Figure 4). With the implementation of limited entry following the 1981 sac roe season, participation in the fishery was restricted to past participants until permanent transferable permits could be awarded. From 1982 through 1993 gear levels were relatively constant with 29 to 45 seiners and 62 to 86 gillnetters participating. With an increase in herring abundance and prices, and the closure of the Prince William Sound herring fishery, the number of seine permit holders participating increased abruptly during the 1994 through 1997 seasons, with 73 purse seine permit holders fishing in 1995. The escalation in seine permit holder participation resulted in increased competition among seiners and between seiners and gillnetters. In 1997 and 1998 herring prices declined and seine participation fell over 50%. Gillnet gear participation took an even sharper drop, with 59 permit holders fishing in 1997 resulting in an average of 10 gillnet fishermen participating annually since 2000 (Table 2).

Guideline Harvest Levels

From 1974 through 1978 there was an area-wide harvest quota of 3,400 tons (Manthey et al. 1979). From 1979 through 1984 the area-wide harvest quota was reduced to 2,400 tons (Table 2) and guideline harvest levels (GHLs) were established for four large geographical areas. Descriptions of districts and sections were established in regulation in 1981, with 7 districts and 46 sections identified that year. Starting in 1985, annual GHLs were established by section and were based on stock status trends. From 1985 through 2001, the combined annual GHLs of all sections ranged from 4,550 tons in 1994 to 1,495 tons in 1999 (Table 2). From 1999 through 2002, GHLs for the fishery were at low levels, based on more conservative management and, for some sections, declines in herring abundance. Starting in 2003, the stock status for most districts improved and the GHLs were raised each year through 2007 (Table 2; Wadle et al. 2007).

Harvest Strategy

Overall, the regulatory effect of the developmental phase of the fishery (1977 to 1982) was the emergence of a relatively stable herring sac roe fishery through 1991. Two strong year classes, from

the 1987 and 1988 brood years, resulted in a dramatic biomass increase of some stocks and record to near-record harvests in the 1992 through 1995 seasons (Table 2). The increase in herring abundance occurred during years of high prices and as a result fishery participation grew. With the decrease in prices, followed by herring stock declines, gillnet permit holders had little harvest opportunity when competing against purse seine permit holders and they promoted a change in fishery management.

An allocative harvest strategy was developed through the efforts of the BOF Herring Task Force (established in 1999) that consisted of purse seine and gillnet permit holders, and Alaska Department of Fish and Game (ADF&G) staff. The task force developed a harvest strategy that provides opportunity for gillnet permit holders to harvest approximately 25% and purse seine permit holders to harvest approximately 75% of the total preseason GHL for the management area (5 AAC 27.535(e)).

The harvest strategy requires the department to establish GHLs by section, based on historical harvest data, current and past fishery performance, commercial catch samples, and aerial biomass surveys. The department is then required, for each district that has more than one section open to fishing, to assign 20% to 30% of the GHL to gillnet permit holders and 70% to 80% of the GHL to purse seine permit holders (5 AAC 27.535(e)(2)(D)). This is accomplished by designating one gear type for each section with a GHL.

During the 2002 BOF meeting only one change was made to the allocative harvest strategy. That change combined the three Afognak Districts, treating them as one district, for allocation purposes (5 AAC 27.535(e)(2)(C)(ii)).

During the 2005 BOF meeting several changes were made to the allocative harvest strategy. One allowed the department to combine adjacent sections within a district and manage them as a single unit when information indicates that one stock of herring is being harvested. The plan was also changed so that purse seine and gillnet gear be allowed to fish the same section in order to achieve the allocation percentages within a district. Changes also direct the department to manage the fishery to achieve the highest level of product quality; previous regulations directed fishery management without regard for herring roe quality. Lastly, a conservation provision concerning section harvest overages being applied to a district GHL was eliminated from the plan.

FISHERY MANAGEMENT

GHL Criteria

Preseason GHLs are established for all sections that have produced consistent herring harvests in previous seasons and reflect the status of a particular herring stock. In 2007, section GHLs ranged from 10 to 1,700 tons. Criteria for establishing GHLs involves evaluation of a variety of information to determine stock status trends, including: 1) fishery performance during preceding seasons (i.e., harvest timing, harvest duration, average school size); 2) trends in age composition (i.e., level of recruitment of age-3 herring, the proportion of age-5 and younger herring, and the proportion of age-2 herring as an indicator of future recruit strength); 3) observations of spawn and juvenile herring; 4) department and industry aerial surveys; 5) hydroacoustic surveys; 6) test fishery data including age composition and biomass estimates; and 7) aged-structured analysis (ASA) modeling. Preseason GHLs have generally reflected the actual harvests (Figure 5) and have aided fishermen and processors in planning prior to the start of each season.

Fishery Characteristics

The KMA herring sac roe fishery currently occurs in approximately 30 bays and coastal locations (Figure 2). The fishery opens at noon on April 15, with most of the management area opening concurrently. Historically the concurrent opening prior to any major buildup of herring, was intended to distribute effort and harvest; however, during the last nine years purse seine fishermen have concentrated in areas known to have early spawning herring and the largest GHLs. With the allocation plan in effect since 2000 department managers have used EOs to adjust fishing time and area if overharvest concerns exist. Several sections known to have later spawning and larger stocks were also opened at a later date, when the department was available to monitor those fisheries.

ADF&G historically relied on the fishing industry to establish roe recovery and minimum size standards. The quality of Kodiak herring was generally high, due to careful selective harvest of mature herring by fishermen and the inseason processing of relatively small amounts of herring over long time periods by local processors. In the 1990s, competition in the purse seine fishery intensified and fishermen were less selective in harvesting high quality herring. In 2003 and 2004 the department took a more active role in some sections to manage for roe quality, which resulted in delayed openings of sections and an increase in roe quality. During the 2005 BOF meeting, the harvest strategy was changed so that the department is now directed to strive for the highest level of product quality (5 AAC 27.535(e)(6)).

Inseason Fishery Management

Processors and independent tender operators are required to provide daily tallies of herring deliveries by section, as well as accurate estimates of herring onboard tenders that have not yet delivered to the processor. ADF&G tallies reports from field personnel, processors, and tenders, to assess herring harvests. Generally, once the harvest estimate meets or approaches the GHL, a section is closed for the season by emergency order. Due to the rapid pace at which some harvests occur, inperiod closures are frequent. In sections that have field personnel present on the grounds, inperiod closures may occur with only a few minutes of advance notice.

Timely and accurate harvest reports, from department field personnel, permit holders, spotter pilots, and processors, are critical for assessing herring harvests and managing the fishery. To date, industry cooperation has greatly aided managers.

2005 Sac Roe Herring Fishery

The 2005 commercial herring sac roe fishery opened on April 15 and the last harvest occurred on May 15. The 2005 GHL for the entire KMA was established at 3,475 tons and a total of 3,463 tons were harvested (Table 2; Figure 5). The purse seine allocation of the GHL was 2,625 tons (75.5%) and the gillnet allocation was 850 tons (24.5%). Purse seiners harvested 2,932 tons, 85% of the total harvest, and gillnet fishermen harvested 531 tons, 15% of the total harvest (Table 2; Figure 6).

In 2005, 32 purse seine permit holders made 134 deliveries (Table 2). The average purse seine harvest was 92 tons, the fifth highest average since 1979 (Table 2). Twelve gillnet permit holders made 61 deliveries for an average harvest of 44 tons, the highest since 1979 (Table 2). The exvessel price paid for 10% roe recovery was approximately $500 per ton at the dock amounting to an estimated average exvessel earning of $45,813 for purse seine permit holders and $22,125 for gillnet permit holders (Table 2; Figure 7). The total exvessel value of the 2005 fishery was an estimated $1,731,500, the highest since 1996 (Table 2; Figure 8).

Large purse seine harvests occurred in the Village Islands/Uganik Bay sections of Uganik District where 1,311 tons were harvested from a 1,200 ton purse seine GHL (Tables 3 and 4). In the Inner Uyak Bay Section of Uyak District 406 tons were harvested compared to the GHL of 250 tons (Tables 5 and 6). The East Sitkalidak, West Sitkalidak, Barling Bay, Inner Ugak Bay, and Outer Kiliuda Bay sections in the Eastside District had a harvest of 830 tons where the combined GHLs were 650 tons for these sections (Tables 7 and 8). Large harvests also occurred in the Inner Alitak Bay, Outer Deadman Bay, Inner Deadman Bay, and North Olga Bay sections of the Alitak District by purse seine gear where 319 tons were harvested from the combined GHLs of 225 tons (Tables 9 and 10). The Paramanoff Bay Section of the West Afognak District was assigned a preseason GHL of 250 tons; however, this section was not opened due to low herring abundance (Tables 11 and 12). The Tonki Bay Section of the North Afognak District was designated as exploratory and had a harvest of 16 tons (Tables 11 and 12). In the Kizhuyak Bay Section of the Inner Marmot District 44 tons were harvested from a 50 ton GHL (Tables 13 and 14). Roe recovery from purse seine harvests averaged 10.7% (Figure 9).

Gillnet permit holders caught the majority of their herring in the Village Islands/Uganik Bay sections where 253 tons were harvested from the 250 ton GHL (Tables 3 and 4). The Brown's Lagoon and Zachar Bay sections of the Uyak District had a harvest of 33 tons where the GHLs totaled 30 tons (Tables 5 and 6). The Shearwater Bay, Inner Kiliuda Bay, and Outer Ugak Bay sections of the Eastside District had a harvest 88 tons where the combined GHLs for these sections were 205 tons (Tables 7 and 8). The Afognak Districts had a harvest of 82 tons by gillnet permit holders, with harvests coming from the Danger Bay Section and the combined Kitoi Bay, MacDonalds Lagoon, and Izhut Bay sections where the GHLs were 85 tons collectively (Tables 11 and 12). The Women's Bay Sections had a 25 ton harvest from a 20 ton GHL (Tables 13 and 14). Roe recovery from gillnet sections averaged 10.6% (Figure 9).

2006 SAC ROE HERRING FISHERY

The 2006 sac roe season opened at noon April 15 and the last harvest occurred May 18. The total 2006 GHL was established at 3,705 tons and 2,643 tons were harvested (Table 2; Figure 5). The purse seine allocation of the GHL was 2,745 tons (74.1%) and the gillnet allocation of the GHL was 960 tons (25.9%). Purse seine permit holders harvested 2,617 tons, 99% of the total harvest and gillnet fishermen harvested 26 tons, 1% of the total harvest (Table 2; Figure 6).

The 2006 season was characterized by record low prices. The exvessel price paid for 10% roe recovery was approximately $275 per ton at the dock, the lowest value since 1979 (Table 2). As a result, participating seine permit holders chose to form a combine where a few permit holders fished for all permit holders until April 25. Fisheries were not affected by this combine; however, on-the-grounds managers were able to allow fishing on large and concentrated biomasses by providing only one set at any time. Normally managers would have kept the fleet off of large herring concentrations to prevent overharvest. In 2006, 21 purse seine permit holders made 86 deliveries (Table 2). The average purse seine harvest was 125 tons, the highest since 1979 (Table 2). The estimated average exvessel earning was $34,270 for purse seine permit holders (Table 2; Figure 7). The total exvessel value of the 2006 fishery was an estimated $726,825, the lowest value since 1979 (Table 2; Figure 8).

In 2006, purse seine effort was concentrated in similar areas as previous years. The Village Islands/Uganik Bay sections of the Uganik District had a GHL of 1,200 tons and 1,222 tons were harvested (Tables 3 and 4). In the Inner Uyak Section of the Uyak District, 223 tons were harvested

from a 300 ton GHL (Tables 5 and 6). The Eastside District had a combined harvest of 688 tons from the East Sitkalidak, West Sitkalidak, Barling Bay, Inner Ugak Bay, Outer Kiliuda Bay, and Kaiugnak sections where the GHLs totaled 750 tons (Tables 7 and 8). The Outer Deadman Bay, Inner Deadman Bay, North Olga Bay, and Upper Olga Bay sections in the Alitak District had a combined harvest of 216 tons out of a total GHL of 325 tons (Tables 9 and 10). The Danger Bay Section of the South Afognak District had a 181 ton harvest from a 90 ton GHL (Tables 11 and 12). The Kizhuyak Bay Section of the Inner Marmot District had a harvest of 87 tons out of a 60 ton GHL (Tables 13 and 14). Roe recovery from purse seiners averaged 11.1% (Figure 9).

Due to the low prices, gillnet participation dropped and fewer than three permit holders participated in the 2006 fishery. All harvest occurred in the Village Islands/Uganik Bay sections. A total of 26 tons were harvested from a GHL of 300 tons (Tables 3 and 4). Gillnet roe recovery averaged 10.8% (Figure 9).

2007 SAC ROE HERRING FISHERY

The 2007 sac roe fishery began at noon April 15 and the last harvest occurred on May 21. The GHL for the entire KMA was established at 4,000 tons and a total of 2,546 tons were harvested (Table 2; Figure 5). The purse seine allocation was 2,915 tons (72.9%) and the gillnet allocation was 1,085 tons (27.1%). Purse seine fishermen harvested 2,510 tons, 99% of the total harvest (Table 2; Figure 6). Gillnet fishermen harvested 36 tons, 1% of the total harvest (Table 2; Figure 6).

Gillnet effort was expected to be light in 2007. As a result, the department opened gillnet only areas by EO to continuous fishing beginning at noon on April 15. Normally gillnet areas follow a fishing schedule that allows them to fish from noon on even-numbered days until noon on odd-numbered days (24-hour open periods followed by 24-hour closed periods).

In 2007, the exvessel price paid for 10% roe recovery was approximately $400 per ton at the dock and 21 purse seine permit holders made 105 deliveries (Table 2). The average harvest by purse seine gear was 120 tons, the second highest average since 1979 (Table 2). Three gillnet permit holders made eight deliveries and harvested 36 tons for an average harvest of 12 tons per vessel, the lowest average since 2000 (Table 2). The estimated average exvessel earning was $47,810 for purse seine permit holders and $4,800 for gillnet permit holders (Table 2; Figure 7). The total exvessel value of the 2007 fishery was an estimated $1,018,400 (Table 2; Figure 8).

In 2007, Kodiak experienced a late winter which likely contributed to a one-to two-week delay in the harvests of most sections. Water temperatures were colder than normal and herring ripened and spawned later. In 2007, fishermen had trouble finding marketable older age-class herring separated from smaller, younger, and non-marketable herring.

Purse seine harvests in 2007 occurred in similar areas as previous years. The largest harvest was in the Village Islands/Uganik Bay sections of the Uganik District with a harvest of 1,389 tons out of a GHL of 1,350 tons for purse seine gear (Tables 3 and 4). The East Sitkalidak, West Sitkalidak, Barling Bay, Outer Ugak Bay, and Outer Kiliuda Bay sections in the Eastside District had a harvest of 597 tons from a combined GHL of 800 tons (Tables 7 and 8). The Inner Alitak Bay, Outer Deadman Bay, and Inner Deadman Bay sections in the Alitak District had a harvest of 350 tons from combined GHLs of 225 tons for these sections (Tables 9 and 10). The Danger Bay Section in the South Afognak District had a 174 ton harvest from a 120 ton GHL (Tables 11 and 12). Roe recovery from purse seine harvests averaged 10.8% (Figure 9). No herring were harvested in the Inner Uyak Bay Section where it was difficult to find marketable herring (Table 5).

Gillnet permit holders harvested 17 tons from the 30 ton GHL in the Women's Bay Section of the Northeast District (Tables 13 and 14). The Kizhuyak Bay Section of the Inner Marmot District had a gillnet harvest of 6 tons out of a 60 ton GHL (Tables 13 and 14). Harvests totaled 13 tons from the 40 ton GHL in the combined Izhut Bay, Kitoi Bay, and MacDonalds Lagoon sections of the South Afognak District (Tables 11 and 12). Gillnet harvests averaged 8.7% roe recovery (Figure 9).

CATCH SAMPLING

A total of 3,873 herring were collected for age, weight, and length (AWL) data from harvests, test sets, and ADF&G trawl samples during the 2007 sac roe season. Samples were taken from 12 sections, nine of which had commercial harvests. The remaining three sections were either closed, or no harvest occurred. Age-6 herring were the dominant age class in the 2007 season, representing an estimated 46.7% of the total herring sampled (Table 15). The remaining age classes represented the following percentage of the samples taken: 2.9% age-2, 11.8% age-3, 13.4% age-4, 9.4% age-5, 5.7% age-7, 4.0% age-8, 2.1% age-9, 2.4% age-10, and less that 1% age-11 and older (Table 15). No herring were collected from gillnet harvests. Generally, herring from Alitak Bay and the eastside of Kodiak Island were larger at age than those found on the westside of Kodiak (Table 16).

STOCK ASSESSMENT

ADF&G evaluates fishery performance and survey information to assess trends in stock status. Hydroacoustic and aerial surveys, conducted by the department, are utilized to assess herring abundance prior to, during, and after the commercial fishery and to survey closed sections. ADF&G research vessels are also used to collect herring samples by trawl, gillnet, and jig gear. Age composition information from these samples provides insight into recruitment trends and guides the department when adjusting GHLs. For example, areas with strong percentages of age-4 and younger herring (recruitment) will not be aggressively fished and will have conservative GHLs, while areas with older age classes (9 or more years old) will be more aggressively fished with increased GHLs.

Industry aerial observers and permit holders have aided managers by providing biomass estimates, spawn observations, fleet movements, and harvest estimates. Commercial herring pilots are very experienced and have been involved for several seasons in the KMA and other statewide herring fisheries. The department has also received assistance from air charter pilots with herring and spawn observations.

The results of aerial and hydroacoustic assessments can provide a limited evaluation of the total biomass. Problems associated with herring assessment in the KMA include: 1) herring tend to be near the surface, and hence more visible, during the evening and early morning hours, limiting the time fish are observable from the air; 2) most fishing sections have several distinct schools of herring that spawn from April through June; 3) herring may stay within an area for the duration of the sac roe season or may move to another district, which may lead to duplicated or incomplete biomass estimates, or incorrect assignment to a spawning stock location; 4) the KMA encompasses a large geographical area; and 5) adverse weather conditions. Hydroacoustic surveys are limited in shallower waters, and the extent of herring avoidance to vessel noise is unknown. There also appears to be a significant amount of subtidal spawning, occurring in water 10 to 20 fathoms in depth, which is not detectable from aerial surveys.

Due to the low gillnet effort since 1998 it is difficult to use fishery performance as an indicator of stock status within the gillnet sections. In 2007 no commercial catch samples were collected from gillnet sections.

STOCK STATUS BY DISTRICT

The following is a review of stock status as indicated by recent fishery performance, age composition data, recruitment trends, and survey data by district. Herring can generally be found seasonally in all bays of the KMA (Figure 2). ADF&G currently monitors approximately 70 sections that are known to have spawning populations of herring. The majority of the department's assessment efforts target larger herring stocks. Generally, there is less information available for the smaller stocks of herring so the evaluation of these stocks is more tenuous. In some cases, such as sections of the Mainland District, several years may elapse before new information becomes available. The department also considers information provided by commercial herring fishermen and pilots, air taxi operators, and remote area residents, concerning herring distribution, biomass estimates, and spawn sightings, when determining stock status.

West Afognak District

There are six sections in the West Afognak District, and five are known to have spawning stocks of herring (Figure 2). Paramanof Bay has the largest spawning stock within this district; however, this stock has been at low levels since 2005. In 2007, the R/V Resolution conducted hydroacoustic surveys in mid April. The results were encouraging and the observed biomass was estimated to be greater than 2,500 tons. ADF&G staff onboard was able to trawl some herring and the samples consisted of young juvenile fish. The sample was made up of 88.8% age-2, 9.0% age-3, and 2.0% age-4 (Table 15). Stocks in the West Afognak District appear to be rebounding from recent low levels with excellent recruitment observed in 2007.

South Afognak District

The South Afognak District comprises six sections and the Danger Bay Section currently has the largest stock of herring in this district (Figure 2). In 2007, a 120 ton GHL was established for this section and purse seine permit holders harvested at total of 174 tons (Table 11 and 12). Commercial catch samples showed the harvest was made up of 17.8% age-3, 28.4% age-4, 11.4% age-5, 18.8 % age-6, 11.4% age-7, and 6.4% age-8 (Table 15). Hydroacoustic surveys estimated nearly 3,000 tons in the Danger Bay Section during 2007.

In 2007, the MacDonalds Lagoon, Kitoi Bay, and Izhut Bay sections were combined and managed as one gillnet section with a 40 ton GHL (Table 12). Gillnet permit holders harvested 13 tons from this section (Table 11).

North Afognak District

Five sections compose the North Afognak District and spawning stocks of herring occur in all five sections though these stocks tend to be small (less than 20 tons; Figure 2). Large biomasses were observed in some of these sections during 2007. A department aerial survey observed over 600 tons in the Perenosa Bay and Delphin Bay sections. Industry pilots also reported seeing large numbers of herring in these areas. Purse seine fishermen reported seeing several large schools in the Tonki Bay Section that were composed of young fish, indicating strong recruitment for this section.

Uganik District

The Uganik District consists of nine sections on the northwest side of Kodiak Island (Figure 2). During the last 10 years this district has been the most productive in the KMA, and hydroacoustic and aerial survey information indicate that the Village Islands spawning biomass is currently the largest in the KMA. The total biomass of herring observed in the Village Islands/Uganik Bay sections has been estimated from 10,000 to 30,000 tons (herring congregate in Uganik Bay for a month or longer, complicating biomass estimation). The 2007 GHL for this section was a record 1,700 tons for all gears combined and 1,389 tons were harvested by purse seine gear (Tables 3 and 4). Age composition data from the 2007 Village Islands/Uganik Bay sections commercial sac roe purse seine fishery indicate excellent recruitment. The predominant age classes were composed of 14.6% age-3, 28.8% age-4, 13.7% age-5, 9.5% age-6, 8.5% age-7, 12.3% age-8, 5.1% age-9, and 5.6% age-10 (Table 15). Stocks in the Uganik District are at historic high levels and increasing.

Uyak District

Through the 1980s, the Uyak District was the largest herring producing district in the KMA (Figure 2). In the early 1990s these stocks began declining and were at low levels for several years. In 2002, aerial surveys indicated that these stocks were improving and several sections were reopened in 2004. In 2007 the GHL for the Inner Uyak Bay Section was 300 tons and no harvests occurred (Tables 5 and 6). Fishermen had trouble catching marketable herring and their catches were composed of juvenile herring that were released. Samples from test sets were composed predominately of 14.2% age-3, 37.4% age-4, 22.4% age-5, and 11.5% age-6 (Table 15). Aerial and hydroacoustic surveys indicated approximately 2,000 tons in this section during 2007.

The Brown's Lagoon Section was open to gillnet gear in 2007 with a 50 ton GHL (Table 6). No effort was made in this section; however, the R/V Resolution was able to conduct hydroacoustic surveys and collect trawl samples. Approximately 800 tons of herring were estimated in the section during 2007. Samples showed the predominant age classes were composed of 19.0% age-2, 43.8% age-3, and 21.9% age-4 (Table 15). Stocks in the Uyak Bay District have improved from the low levels of the 1990s.

Inner Marmot District

There are five sections within the Inner Marmot District and all have known spawning stocks of herring though most are small (Figure 2). The Kizhuyak Bay Section has the largest stock of herring in the district. In 2007 this section was opened to gillnet gear with a 60 ton GHL and approximately six tons were harvested (Tables 13 and 14).

Eastside District

The Eastside District is composed of four bay complexes; Ugak Bay, Kiliuda Bay, East Sitkalidak Strait, and West Sitkalidak Strait (Figure 2). Sixteen sections have been established and only one, the Outer Sitkalidak Section, has no history of herring sac roe harvests. Due to the reduced gillnet fleet and low herring prices, the smaller and more distant gillnet sections of this district have not been fished in recent years. Hydroacoustic surveys in this district are less frequent than other portions of the KMA.

Generally, the East and West Sitkalidak sections have the earliest spawning herring in the KMA, with initial spawns occurring in late March. In 2007, the GHL for the East Sitkalidak Section was

established at 150 tons with 144 tons harvested by purse seine gear (Tables 7 and 8). Age compositions from the harvest were dominated by age-6 (83.5%) herring, other age classes included age-5 (6.5%) and age-7 (6.0%; Table 15).

The West Sitkalidak Section GHL was established at 125 tons in 2007 and 144 tons were harvested (Tables 7 and 8). Age compositions from this harvest were composed of 81.0% age-6, 6.0% age-7, and 5.0% age-5 herring (Table 15).

The Barling Bay Section, adjacent to the West Sitkalidak Section, has been the most consistent herring producer in the Eastside District and 75 tons were harvested from the 75 ton GHL (Tables 7 and 8). Commercial catch samples showed good recruitment with 12.3% age-3, 5.1% age-4, 5.8% age-5, 59.7% age-6, and 6.4% age-10 herring (Table 15).

The Inner and Outer Kiliuda Bay sections have been consistent and strong herring producers during the last 10 years. In 2007 the GHL for the Outer Kiliuda Bay Section was set at 200 tons (Table 8). However, fishermen had trouble locating marketable herring and only nine tons were harvested (Table 7). No commercial catch samples were obtained from the Kiliuda Bay sections in 2007. In 2007 the GHL for the Inner Kiliuda Bay Section was set at 75 tons and no fish were harvested by gillnet vessels (Tables 7 and 8).

The Inner and Outer Ugak Bay sections have been strong herring producers in the past. The 2007 GHL for the Outer Ugak Bay Section was 250 tons for purse seiners (Table 8). A total of 224 tons were harvested and age composition from the harvest comprised 40.0% age-3, 10.8% age-4, 10.5% age-5, and 22.4% age-6 (Tables 7 and 15). Herring stocks in the Eastside District are near historic high levels and increasing in some sections.

Alitak District

In 2007, the ten sections in the Alitak District were modified and one was eliminated by EO in order to clarify section lines (Figure 10). All but the Outer Alitak Section are known to have herring stocks. In the early 1990s herring stocks began declining in the Alitak District, and by 1998 most sections were closed. In 2002, aerial surveys reports indicated an increase in herring abundance. In 2003 and 2004 some sections were opened to gillnet gear to act as test fisheries. By 2005 several sections that had been closed were reopened.

In 2007, the GHL for the Inner Deadman Bay Section was set at 75 tons and 159 tons were harvested by purse seine gear (Tables 9 and 10). Age classes from this harvest were dominated by age-6 herring representing 71.7% of the harvest (Table 15). There was also good recruitment in the harvest with age-3 herring representing 6.9% and age-4 herring representing 12.3% of the harvest.

The GHL for the Outer Deadman Bay Section was set at 75 tons and 97 tons were harvested by purse seine gear (Tables 9 and 10). Age compositions from the harvest were composed of 4.4% age-3, 8.6% age-4, 8.3% age-5, 69.8% age-6, and 3.8% age-7 (Table 15).

The Inner Alitak Bay Section was open to purse seine gear in 2007 with a 75 ton GHL and 94 tons were harvested (Tables 9 and 10). Age compositions from the harvest also showed excellent recruitment and were composed of 8.1% age-3, 8.5% age-4, 10.5% age-5, 66.2% age-6, and 2.8% age-7 (Table 15).

No other information was obtained from the Alitak District in 2007; however, age compositions in previous years from the Upper Olga Bay and North Olga Bay sections have been similar to other sections in the district. Herring stocks in the Alitak District are increasing.

Northeast District

The Northeast District is composed of five sections and four have known spawning stocks of herring (Figure 2). The Women's Bay Section currently has the largest stock of herring in this district. In 2007, 17 tons were harvested by gillnet permit holders from a 30 ton GHL (Tables 13 and 14).

Mainland District

There are three Mainland districts comprising 12 sections (Figure 2). The last commercial herring harvest from the Mainland Districts occurred in 1997. Seven sections were open as exploratory in 2007; however, no effort occurred. No information has been obtained from the Mainland District in recent years.

HERRING FOOD AND BAIT FISHERY

HISTORICAL PERSPECTIVE

The earliest recorded commercial herring food and bait harvest in the KMA occurred in 1912 (Table 17). In the early 1920s, the fishery expanded and large herring were sought for food products, such as salted and pickled herring, which were in high demand after World War I. By the late 1920s the demand for herring food products had declined and the fishery switched to reduction products, such as fishmeal and oil. During the peak years of the reduction fishery (1934 to 1950) harvests vastly surpassed recent food and bait herring harvests (Figure 11). During the reduction fishery the major harvest areas were located in eastern Shelikof Strait and adjacent bays and straits along the west side of Kodiak and Afognak Islands. Quotas and harvest weights were measured by barrels (250 lbs. of herring equaled one barrel) until 1956 when the unit of measure was changed to tons. Large (approximately 70 foot) "sardine seiner" type vessels were used in conjunction with holding pounds to supply herring to five major reduction plants (Manthey et al. 1978). In addition, small seine and gillnet operators participated in a portion of the food fishery and delivered to floating and shore based salting and pickling operations.

From the early 1960s to 1973 there were no harvest quotas or closed seasons. From 1974 through 1980 an open fishing season was established between July 1 and February 28. In 1979 and 1980, GHLs for the food and bait season were established at 12,600 tons. The season opening date for the fishery changed from July 1 to August 15 for the years 1981 through 1984. As a result of the rapidly developing sac roe fishery, the GHL for the food and bait season was reduced to 1,000 tons in 1981 and remained at that level through 1987. In 1985 the season opening date was moved to August 1. Regulatory GHLs for the herring food and bait fishery were replaced with a regulatory harvest strategy in 1988 that established variable GHLs based on herring stock status. The season opening date was moved to October 1 in 1999 to allow department staff additional time to prepare the Kamishak herring forecast and manage the fishery in the fall. In 2005 the season opening date switched to September 1 to allow for more market opportunities for the herring as bait in the Bering Sea red king crab *Paralithodes camtschaticus* fishery. The herring food and bait season closing date has remained February 28.

Fishing periods through 1996 were unrestricted, 24 hours per day, seven days per week. In 1997 fishing periods were reduced to 12 hours (8:00 AM to 8:00 PM), seven days per week. The restriction of fishing period length was intended to slow harvest rates in order to ensure that GHLs were not greatly exceeded.

Gear used in this fishery includes trawl, seine, and gillnet. Gear was first restricted for the 1986/87 season when seine gear was limited to 100 fathoms in length and 1,025 meshes in depth and gillnet gear was limited to 150 fathoms in length with no depth restrictions. For the 1993/94 season purse seine specifications were increased to 150 fathoms in length and 1,625 meshes in depth. These changes made seine gear more competitive with trawlers; seine fishermen harvested an average of only 2% of the food and bait harvest from 1987 through 1992 compared to 54% of the total food and bait harvest from 1993 to 1998. There are no restrictions on trawl gear, which is fished mid-water with no bottom contact. All three gear types fished the same areas and were subject to the same fishing periods.

In 2001 this fishery was designated as a limited entry fishery by the Commercial Fisheries Entry Commission (CFEC) and a points system was developed to evaluate past fishery participation and determine who would receive a limited entry permit. In 2002 CFEC issued limited entry permits that included five purse seine/gillnet permits and four trawl permits.

MANAGEMENT PLAN HISTORY

During the fall and winter months of the early 1980s, major concentrations of herring were observed in eastern Shelikof Strait and adjacent bays along the west side of the Kodiak Archipelago. The biomass exceeded that of known KMA spawning stocks. Herring food and bait fishermen targeted these herring, but the stock composition was unknown. In 1986 a stock identification study, based on scale pattern analysis, was conducted on herring harvested from a large biomass located in the northeastern part of the Shelikof Strait (Johnson et al. 1988). Results of the study indicated that at least 80% of the Shelikof herring catch sampled were Kamishak Bay stocks, which spawn within the Lower Cook Inlet (LCI) Management Area.

In 1988 the BOF allocated not more than two percent of the previous season's total available Kamishak Bay spawning herring biomass for harvest during the Kodiak herring food and bait fishery. For local Kodiak spawning stocks, which were exploited during the sac roe fishery, the food and bait GHL was to be determined based on 10% of the harvest that occurred in the previous KMA herring sac roe season.

Problems subsequently developed after implementation of this management plan because it was difficult to assign harvest from the intermixed stocks to either Kodiak or Kamishak if the stocks from both areas had similar age compositions. This plan was in effect through the 1992/93 season.

In the fall of 1992 the BOF approved the Kamishak Bay District Herring Management Plan (5 AAC 27.465), which outlines criteria for the management of the Kamishak Bay herring sac roe and the Shelikof Strait herring food and bait fisheries. This plan defines allocations to each fishery based on biomass estimates.

In 1993 the BOF placed into regulation a harvest strategy defining the criteria for managing the Kodiak herring food and bait fishery (5 AAC 27.535). This strategy combines the Kamishak stock GHL with the Kodiak stock GHL for food and bait districts (West Afognak, Uganik, and Uyak districts; Figure 2). This portion of the KMA food and bait fishery is referred to as the Shelikof Strait food and bait herring fishery. The Kamishak allocation to the Shelikof Strait food and bait herring fishery ranges from 1% to 2% of the Kamishak spawning biomass. When the combined GHL is achieved the Shelikof Strait food and bait districts (West Afognak, Uganik, and Uyak) are closed collectively. This harvest strategy alleviates the problem of identifying the spawning stock of a harvest in areas where intermixing may occur. The plan also closes the Kamishak Bay sac roe

fishery and the Shelikof Strait food and bait fishery north of the latitude of Miners Point (Uganik Bay) when the Kamishak spawning biomass falls below 8,000 tons (5 AAC 27.535(d), 1993).

In 1999 the BOF made additional changes to the KMA herring food and bait fishery. The season opening date was changed to October 1 so department staff in the LCI management area would have additional time to complete the Kamishak herring forecast and determine the resulting allocation for the Shelikof Strait food and bait fishery. Prior years' fisheries generally occurred based on preliminary Kamishak forecasts, and actual harvests were often either lower or higher than the final Kamishak allocation, which was sometimes completed weeks after the fishery occurred. The harvest strategy was also changed so that GHLs for KMA stocks were based upon 10% of the GHLs established for the preceding KMA sac roe fishery by section. The previous regulation based the food and bait GHL upon 10% of the actual KMA sac roe harvest by section. In cases where an excessive harvest occurred during the sac roe fishery, the related food and bait GHL would also be high. Lastly, changes to the plan clarified and put into regulation the previous practice of limiting a district harvest to no more than the sum of the individual section GHLs it contains. These changes promoted a more conservative approach to managing this fishery.

In November 2001 the BOF adopted changes to the Kamishak Bay District Herring Management Plan based on the results of a threshold analysis preformed by LCI department staff. The analysis concluded that the minimum spawning biomass threshold should be at least 6,000 tons (5 AAC 27.465(e)(3)), 2,000 tons less than the previous minimum spawning biomass threshold of 8,000 tons. Other changes to the plan included a reduction in the maximum exploitation rate for Kamishak herring, which in turn lowered the allowable exploitation rate of the Shelikof Strait fishery from 2% to 1.5% of the Kamishak spawning biomass. Last, a portion of the plan, which required adjustment of Shelikof Strait young age class harvests to reflect the estimated weight of an equal amount of older age class herring, was eliminated.

KAMISHAK FISHERY CLOSURE

The biomass forecasts for Kamishak Bay herring for the 2005 to 2007 seasons has been well below the minimum spawning biomass of 6,000 tons that must be met before commercial fisheries may occur (Hammarstrom 2005, 2006). Additionally, stock assessment surveys from 2005 through 2007 determined that over 50% of the population consists of younger age class fish. The Kamishak Bay District Herring Management Plan states that commercial harvests must target older, repeat spawners in order to protect recruit-class herring. The Kamishak Bay District fishery has been closed since 1999 and the population has sharply declined (Otis and Cope 2004). Due to the low stock status, the Kamishak Bay sac roe fishery was closed for the 2005 through 2007 seasons and the Shelikof Strait food and bait fishery north of the latitude of Miners Point was closed for the 2005 through 2007 seasons.

FOOD AND BAIT COMBINE FISHERIES 2005 TO 2007

Due to low GHLs and concerns for manageability of a competitive fishery on a highly aggregated stock, the department and permit holders agreed to conduct combine fisheries for the 2005-2007 seasons. The biggest obstacle to a competitive fishery is how to decide an equitable fishing period for the two gear types. Combine fisheries have been conducted for the 2005-2007 seasons where only one purse seine permit holder fishes and the proceeds are split among all permit holders. Generally one tender has also been used and two purse seine permit holders have worked together on one purse seine vessel to catch the herring. Fishing efforts have only targeted the Uganik District south of the latitude of Miners point. The Eastside, Alitak and Uyak districts

have remained unfished from 2005 through 2007. The trawl permit holders have not participated in the harvesting for the combine fishery.

2005 Food and Bait Fishery

In 2005, the Uganik District south of the latitude of Miners Point was opened to commercial herring food and bait fishing on September 28. The Uganik District had a GHL of 156 tons. A total of 168 tons were harvested and the fishery closed on December 22. This accounted for the entire herring food and bait harvest in the KMA. Other areas that could have opened were the Eastside Kodiak District (85 ton GHL), the Uyak District (33 ton GHL), and the Alitak District (28 ton GHL). There were no requests from permit holders to open any of these areas.

2006 Food and Bait Fishery

In 2006, the department opened the commercial herring food and bait fishery on September 26. The areas that were opened included: the Uganik District south of the latitude of Miners Point (159 ton GHL), the Eastside District (98 ton GHL), the Uyak District (40 ton GHL), and the Alitak District (45 ton GHL). A total of 169 tons were harvested from the Uganik District, which was closed for the remainder of the season on December 8. There were 183 tons available for harvest from the remaining districts that were not fished.

2007 Food and Bait Fishery

In 2007, the department opened that portion of the Uganik District south of the latitude of Miners Point on September 29 with a 179 ton GHL. Other areas that may be opened by EO during the 2007 season include the Eastside District (106 ton GHL), the Uyak District (40 ton GHL), and the Alitak District (45 ton GHL). Results of the 2007 food and bait fishery will not be known until the fishery closes by regulation on February 28, 2008.

HERRING SUBSISTENCE FISHERY

Fishery Characteristics

Prior to 1999, the herring subsistence fishery was referred to as a Personal Use/Subsistence Fishery and had occurred for at least twenty years. The majority of the harvest occurred with gillnets near the Port of Kodiak in Women's Bay. The herring were used primarily for bait in commercial longline and pot fisheries. Before 1999 this fishery was only regulated during the herring sac roe season, from April 15 to June 30, under the conditions of the subsistence permit issued in Kodiak. Gear was limited to a 25 fathom gillnet with no harvest limit. The remainder of the year there were no permit requirements, gear restrictions, or harvest limits.

In 1999 more restrictive regulations were adopted by the BOF. These regulations allowed for a harvest of up to 500 pounds of herring with no permit requirements, except during the sac roe fishing season (April 15 to June 30; Gretsch 2001). A subsistence permit was required for those individuals that wished to fish during the sac roe season or intended to harvest more than 500 pounds of herring annually. The maximum annual harvest was limited to 2,000 pounds per permit. In recent years most of the herring caught for subsistence were used for bait (in sport or commercial fisheries), food, or fertilizer.

In 2000 herring subsistence harvests escalated due to bait needs created by the reopening of the commercial tanner crab *Chinoecetes bairdi* fishery in the KMA. ADF&G was concerned about the

increased herring subsistence harvest and the appropriateness of taking subsistence herring for use as bait in a commercial fishery. The department submitted proposals for regulation changes to the BOF in 2001, and the BOF changed regulations to allow for both types of historic harvests. The new subsistence regulation allows for the harvest of up to a total of 500 pounds of herring annually and requires that fishermen obtain a permit prior to fishing (5 AAC 01.530(d)). Herring were included on the existing KMA salmon and crab subsistence permit. Also in 2001 a new regulation (5 AAC 27.545) allows for the harvest of up to 500 pounds of herring by commercial permit holders to be used as bait in commercial fisheries.

2005-2007 SUBSISTENCE

In 2005, subsistence herring harvests were reported from a total of 37 subsistence permits for a total of 5,335 pounds (Table 18). In 2006, 30 subsistence permits holders reported harvesting 4,535 pounds (Table 18). The 2007 subsistence information will not be available until the majority of permits are returned in March of 2008. Most of the subsistence harvests have been reported from the Eastside, Northeast, and Inner Marmot districts. No commercial permit holders harvested herring to be used as bait in commercial fisheries from 2005 through 2007.

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TABLES AND FIGURES

Table 1.–Historical harvest data for the commercial herring sac roe and food and bait fisheries and percent of the total annual herring harvest by fishery, Kodiak Management Area, 1964 to 2007.

Year	Sac Roe Harvest (Tons)	Food/Bait Harvest (Tons)	Total Herring Harvest (Tons)	Sac Roe Fishery Percent of Total Harvest (%)	Food/Bait Fishery Percent of Total Harvest (%)
1964	568	310	878	65%	35%
1965	657	35	692	95%	5%
1966	2,769	198	2,967	93%	7%
1967	1,662	300	1,962	85%	15%
1968	2,001	15	2,016	99%	1%
1969	1,130	11	1,141	99%	1%
1970	342	8	350	98%	2%
1971	284	44	328	87%	13%
1972	215	50	265	81%	19%
1973	831	178	1,009	82%	18%
1974	868	40	908	96%	4%
1975	8	5	13	62%	38%
1976	5	0	5	100%	0%
1977	338	0	338	100%	0%
1978	904	399	1,303	69%	31%
1979	1,735	125	1,860	93%	7%
1980	2,383	381	2,764	86%	14%
1981	2,065	18	2,083	99%	1%
1982	1,771	326	2,097	84%	16%
1983	2,318	33	2,351	99%	1%
1984	2,163	123	2,286	95%	5%
1985	1,968	102	2,070	95%	5%
1986	1,558	213	1,771	88%	12%
1987	2,146	217	2,363	91%	9%
1988	2,171	340	2,511	86%	14%
1989	2,249	345	2,594	87%	13%
1990	2,347	313	2,660	88%	12%
1991	2,432	215	2,647	92%	8%
1992	4,283	312	4,595	93%	7%
1993	4,929	837	5,766	85%	15%
1994	5,893	677	6,570	90%	10%
1995	4,604	507	5,111	90%	10%
1996	3,386	651	4,037	84%	16%
1997	3,235	756	3,991	81%	19%
1998	2,057	151	2,208	93%	7%
1999	1,651	0	1,651	100%	0%
2000	1,370	0	1,370	100%	0%
2001	1,694	115	1,809	94%	6%
2002	1,677	135	1,812	93%	7%
2003	1,992	199	2,191	91%	9%
2004	3,167	190	3,357	94%	6%
2005	3,463	168	3,631	95%	5%
2006	2,643	169	2,812	94%	6%
2007	2,546	[a]	[a]	[a]	[a]
Averages					
1964 to 2007	2,011	214	2,213	90%	10%
1997 to 2006	2,295	188	2,483	92%	8%
2002 to 2006	2,588	172	2,761	94%	6%
2005 to 2007	2,884	169	3,222	90%	5%

[a] Harvest information will not be available until the fishery closes on February 28, 2008.

Table 2.–Herring sac roe fishery summary of season length, guideline harvest level (GHL), harvest data by gear type, percentage of harvest by gear type, number of landings, and estimated exvessel value, Kodiak Management Area, 1979-2007.

				Harvest by Gear Type		Percent Harvest by Gear Type		Number of Landings by Gear Type		Units of Gear Fished		Average Catch by Gear		Estimated Average Exvessel value [a]		Price per	Estimated Exvessel
Year	Season Length (Days)	GHL (Tons)	Total Harvest (Tons)	Seine (Tons)	Gillnet (Tons)	Seine	Gillnet	Seine	Gillnet	Seine	Gillnet	Seine (Tons)	Gillnet (Tons)	Seine ($)	Gillnet ($)	Ton [a] ($)	Total Value [a] ($)
1979	36	2,400	1,735	1,457	278	84%	16%	-	-	57	125	26	2	$38,342	$3,336	$1,500	$2,602,500
1980	35	2,400	2,383	2,009	374	84%	16%	-	-	92	109	22	3	$15,068	$2,368	$690	$1,644,270
1981	48	2,400	2,065	1,596	469	77%	23%	207	406	79	114	20	4	$14,647	$2,983	$725	$1,497,125
1982	59	2,400	1,771	1,447	324	82%	18%	138	191	45	67	32	5	$17,686	$2,660	$550	$974,050
1983	51	2,400	2,319	1,797	522	77%	23%	164	284	41	64	44	8	$35,063	$6,525	$800	$1,855,200
1984	54	2,400	2,163	1,691	472	78%	22%	138	212	39	69	43	7	$34,687	$5,472	$800	$1,730,400
1985	59	2,000	1,968	1,244	724	63%	37%	118	348	34	81	37	9	$32,929	$8,044	$900	$1,771,200
1986	61	1,690	1,558	1,110	448	71%	29%	132	385	31	71	36	6	$34,016	$5,994	$950	$1,480,100
1987	61	1,640	2,146	1,591	554	74%	26%	122	411	29	62	55	9	$54,862	$8,935	$1,000	$2,146,000
1988	59	2,065	2,171	1,304	867	60%	40%	169	555	33	76	40	11	$51,370	$14,830	$1,300	$2,822,300
1989	76	2,415	2,249	1,513	736	67%	33%	171	627	37	83	41	9	$34,758	$7,537	$850	$1,911,650
1990	75	2,375	2,347	1,644	703	70%	30%	156	544	27	63	61	11	$51,756	$9,485	$850	$1,994,950
1991	83	2,510	2,432	1,697	735	70%	30%	169	587	32	64	53	11	$45,077	$9,762	$850	$2,067,200
1992	77	2,720	4,283	3,260	1,023	76%	24%	185	706	40	74	82	14	$40,750	$6,912	$500	$2,141,500
1993	77	3,525	4,929	4,203	726	85%	15%	237	294	41	86	103	8	$56,382	$4,643	$550	$2,710,950
1994	71	4,550	5,893	4,976	917	84%	16%	285	485	66	57	75	16	$60,315	$12,870	$800	$4,714,400
1995	73	4,480	4,604	3,837	768	83%	17%	280	642	73	71	53	11	$66,858	$13,759	$1,272	$5,856,288
1996	69	4,180	3,386	2,322	1,064	69%	31%	202	890	57	74	41	14	$81,474	$28,757	$2,000	$6,772,000
1997	49	3,435	3,235	2,629	606	81%	19%	183	418	64	59	41	10	$20,539	$5,136	$500	$1,617,500
1998	50	2,030	2,057	1,954	103	95%	5%	110	26	35	7	56	15	$27,914	$7,357	$500	$1,028,500
1999	38	1,495	1,651	1,589	62	96%	4%	94	16	31	5	51	12	$33,984	$8,221	$663	$1,094,613
2000 [b]	37	1,735	1,370	1,290	80	94%	6%	57	23	31	10	42	8	$29,129	$5,600	$700	$959,000
2001	47	1,540	1,694	1,412	282	83%	17%	67	37	33	9	43	31	$21,394	$15,667	$500	$847,000
2002	46	1,860	1,677	1,274	403	76%	24%	37	50	30	14	42	29	$21,233	$14,393	$500	$838,500
2003	42	2,600	1,992	1,738	254	87%	13%	59	45	31	11	56	23	$28,032	$11,545	$500	$996,000
2004	42	2,850	3,167	2,894	273	91%	9%	95	36	27	11	107	25	$53,593	$12,409	$500	$1,583,500
2005	31	3,475	3,463	2,932	531	85%	15%	134	61	32	12	92	44	$45,813	$22,125	$500	$1,731,500
2006	34	3,705	2,643	2,617	26	99%	1%	86	*	21	*	125	*	$34,270	*	$275	$726,825
2007	28	4,000	2,546	2,510	36	99%	1%	105	8	21	3	120	12	$47,810	$4,800	$400	$1,018,400
10 Year Avg. 1997 to 2006	42	2,473	2,295	2,033	262	89%	11%	92	79	34	15	65	22	$31,590	$11,384	$514	$1,142,294
5 Year Avg. 2002 to 2006	39	2,898	2,588	2,291	297	88%	12%	82	48	28	12	84	30	$36,588	$15,118	$455	$1,175,265
3 Year Avg. 2005-2007	31	3,727	2,884	2,686	198	94%	6%	108	35	25	8	112	28	$42,631	$13,463	$392	$1,158,908

[a] Exvessel values are based on dock delivered herring and inseason data.

[b] Beginning in 2000, an allocative harvest strategy was in effect.

* Confidential data.

Table 3.–Herring sac roe harvests (tons) from major sections in the Uganik District 1985-2007**.**

	Kupreanof		Viekoda Bay		Terror Bay		West Uganik Passage		Village Islands / Uganik Bays[a]		District Total[b]	
Year	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet
1985	0	0	12	11	55	8	18	8	77	81	162	108
1986	1	0	20	0	35	13	10	17	114	54	188	83
1987	1	0	27	11	63	6	0	24	84	78	174	120
1988	0	2	12	13	108	0	1	31	135	56	256	102
1989	0	0	26	6	32	44	21	0	159	52	238	102
1990	0	0	15	13	6	8	22	0	140	57	183	78
1991	0	1	24	1	14	4	24	16	119	62	181	84
1992	0	1	167	1	101	1	98	4	511	73	877	80
1993	0	0	95	0	212	2	62	11	689	3	1,058	16
1994	0	0	48	9	338	1	71	10	1,769	38	2,226	58
1995	0	0	0	0	323	34	4	16	905	58	1,232	108
1996	0	0	69	2	33	84	25	11	589	150	716	247
1997	0	0	4	53	225	27	166	3	755	41	1,150	124
1998	Closed	Closed	189	0	155	27	38	0	359	8	741	35
1999	Closed	Closed	81	2	110	16	0	0	499	8	690	26
2000	Closed	Closed	90	Closed	105	Closed	Closed	1	245	10	440	11
2001	Closed	Closed	76	Closed	35	Closed	Closed	9	303	106	414	115
2002	Closed	Closed	0	Closed	0	Closed	Closed	48	487	106	487	154
2003	Closed	Closed	Closed	46	0	Closed	7	Closed	756	2	763	48
2004	Closed	Closed	Closed	3	Closed	21	Closed	96	1,108	17	1,108	117
2005	Closed	Closed	Closed	3	Closed	29	Closed	18	1,311	253	1,311	303
2006	Closed	Closed	Closed	0	Closed	0	Closed	0	1,222	26	1,222	26
2007	Closed	Closed	Closed	0	Closed	0	Closed	0	1,389	0	1,389	0
Averages[c]												
1997-2006	0	0	73	15	90	20	53	19	705	58	833	96
2002-2006	-	-	0	13	0	17	7	41	977	81	978	129
2005-2007	-	-	-	1	-	10	-	6	1,307	93	1,307	110

[a] The Village islands, Northeast Arm, and South Arm sections have been combined and managed as a single section since 2005. For comparative purposes, totals are combined since 1985.

[b] Totals may include harvests from minor sections that are not on table.

[c] Years in which sections were closed are not included in averages.

Table 4.–Herring sac roe Guideline Harvest Levels (GHLs) in tons, for major section in the Uganik District 1985-2007.

	Kupreanof		Viekoda Bay		Terror Bay		West Uganik Passage		Village Islands/ Uganik Bay[a]		District Totals[b]	
Year	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet
1985	10	*	30	*	50	*	30	*	140	*	260	*
1986	10	*	15	*	50	*	20	*	125	*	220	*
1987	10	*	20	*	65	*	15	*	125	*	235	*
1988	10	*	20	*	65	*	15	*	145	*	255	*
1989	10	*	30	*	80	*	15	*	185	*	320	*
1990	10	*	20	*	60	*	15	*	160	*	265	*
1991	10	*	20	*	60	*	20	*	190	*	300	*
1992	10	*	40	*	60	*	25	*	190	*	325	*
1993	10	*	80	*	90	*	75	*	365	*	620	*
1994	10	*	160	*	180	*	75	*	380	*	805	*
1995	10	*	100	*	200	*	75	*	530	*	915	*
1996	10	*	50	*	250	*	40	*	585	*	935	*
1997	10	*	75	*	250	*	20	*	585	*	940	*
1998	Closed	*	75	*	200	*	20	*	355	*	650	*
1999	Closed	*	75	*	100	*	20	*	290	*	485	*
2000	Closed	Closed	75	Closed	100	Closed	Closed	20	250	190	425	210
2001	Closed	Closed	80	Closed	100	Closed	Closed	15	275	130	455	145
2002	Closed	Closed	80	Closed	60	Closed	Closed	15	400	170	540	185
2003	Closed	Closed	Closed	80	60	Closed	60	Closed	800	220	920	300
2004	Closed	Closed	Closed	50	Closed	20	Closed	30	800	120	800	220
2005	Closed	Closed	Closed	25	Closed	30	Closed	60	1,200	250	1,200	365
2006	Closed	Closed	Closed	25	Closed	30	Closed	40	1,200	300	1,200	395
2007	Closed	Closed	Closed	25	Closed	30	Closed	40	1,350	350	1,350	445

[a] The Village islands, Northeast Arm, and South Arm sections have been combined and managed as a single section since 2005. For comparative purposes, totals are combined since 1985.

[b] Totals may include GHLs from minor sections that are not on table.

* Sections open to both gear types with a single GHL.

Table 5.–Herring sac roe harvests (tons) from major sections in the Uyak District 1985-2007.

	Harvester Island		Inner Uyak Bay		Larsen Bay		Brown's Lagoon[a]		Zachar Bay		Spiridon Bay		District Totals[b]	
Year	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet
1985	0	0	107	108	0	4	-	-	64	41	12	68	184	221
1986	0	0	31	53	0	0	-	-	6	48	84	0	120	101
1987	0	0	135	30	12	3	-	-	5	79	115	4	267	116
1988	0	1	115	111	0	1	0	0	6	108	86	72	206	293
1989	0	0	163	127	0	4	0	0	82	52	84	17	329	199
1990	0	0	184	59	0	7	14	9	22	73	114	63	334	211
1991	0	0	152	9	0	8	11	6	94	14	99	37	356	74
1992	5	0	65	16	0	3	8	9	64	23	53	64	195	115
1993	0	0	30	4	16	0	17	2	3	0	17	4	83	10
1994	0	0	28	0	0	4	14	6	0	0	0	6	47	16
1995	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
1996	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
1997	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
1998	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
1999	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
2000	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
2001	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
2002	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
2003	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	19	Closed	Closed	Closed	19
2004	Closed	Closed	370	Closed	Closed	Closed	Closed	Closed	Closed	16	Closed	0	370	16
2005	Closed	Closed	406	0	Closed	Closed	Closed	8	Closed	25	Closed	Closed	406	33
2006	Closed	Closed	223	0	Closed	Closed	Closed	0	Closed	0	Closed	0	223	0
2007	Closed	Closed	0	Closed	Closed	Closed	Closed	0	Closed	0	Closed	0	0	0
Averages[c]														
1997-2006	-	-	333	0	-	-	-	4	-	15	-	0	333	17
2002-2006	-	-	333	0	-	-	-	4	-	15	-	0	333	17
2005-2007	-	-	210	0	-	-	-	3	-	8	-	0	210	11

[a] The Brown's Lagoon Section was established in 1988.

[b] Totals may include harvests from minor sections that are not on table.

[c] Years in which sections were closed are not included in averages.

Table 6.–Herring sac roe Guideline Harvest Levels (GHLs) in tons, for major sections in the Uyak District 1985-2007.

	Harvester Island		Inner Uyak Bay		Larsen Bay		Brown's Lagoon[a]		Zachar Bay		Spiridon Bay		District Totals[b]	
Year	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet
1985	15	*	100	*	20	*	-	-	70	*	70	*	275	*
1986	Closed	*	80	*	10	*	-	-	50	*	50	*	190	*
1987	10	*	120	*	10	*	-	-	65	*	90	*	295	*
1988	10	*	190	*	10	*	10	*	100	*	160	*	490	*
1989	10	*	240	*	10	*	20	*	100	*	160	*	540	*
1990	10	*	240	*	10	*	20	*	100	*	160	*	540	*
1991	10	*	240	*	10	*	20	*	100	*	160	*	540	*
1992	10	*	180	*	10	*	20	*	100	*	120	*	440	*
1993	10	*	135	*	10	*	30	*	75	*	90	*	350	*
1994	10	*	50	*	10	*	30	*	40	*	45	*	185	*
1995	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*
1996	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*
1997	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*
1998	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*
1999	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*
2000	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
2001	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
2002	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
2003	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	15	Closed	Closed	Closed	15
2004	Closed	Closed	300	Closed	Closed	Closed	Closed	Closed	Closed	15	Closed	15	300	30
2005	Closed	Closed	250	50	Closed	Closed	Closed	10	Closed	20	Closed	Closed	250	80
2006	Closed	Closed	300	Closed	Closed	Closed	Closed	50	Closed	40	Closed	10	300	100
2007	Closed	Closed	300	Closed	Closed	Closed	Closed	50	Closed	40	Closed	10	300	100

[a] The Brown's Lagoon Section was established in 1988.

[b] Totals may include GHLs from minor sections that are not on table.

* Sections open to both gear types with a single GHL.

Table 7.–Herring sac roe harvests (tons) from major sections in the Eastside District 1985-2007.

	East Sitkalidak		West Sitkalidak		Barling Bay		Inner Ugak Bay		Outer Ugak Bay		Inner Kiliuda Bay		Outer Kiliuda Bay		Shearwater		District Totals[a]	
Year	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet
1985	54	19	0	0	27	0	21	10	0	0	0	0	0	0	24	0	129	32
1986	29	32	4	0	8	0	52	0	0	0	0	0	0	0	23	0	149	33
1987	0	0	0	0	60	0	51	4	5	5	9	0	0	0	16	0	152	65
1988	68	25	25	0	18	0	24	79	33	97	7	0	0	0	1	15	199	58
1989	98	43	114	15	0	17	45	10	29	0	4	2	0	0	20	0	341	98
1990	98	28	27	29	6	17	93	9	0	0	8	0	0	0	69	0	420	83
1991	59	48	0	67	138	22	92	0	51	0	14	0	0	0	43	0	397	143
1992	37	93	228	127	0	40	80	3	115	0	86	0	0	0	99	63	703	372
1993	233	60	148	138	5	34	94	36	45	7	127	0	0	0	14	77	732	392
1994	200	83	169	266	12	50	114	15	79	5	112	0	60	2	70	43	830	492
1995	152	239	42	64	28	28	32	25	123	12	77	6	132	1	47	65	645	501
1996	95	134	38	34	26	29	7	87	10	44	78	2	85	19	0	53	404	421
1997	10	32	0	6	15	33	113	1	39	1	121	25	106	7	76	67	508	193
1998	17	16	58	4	49	0	107	9	82	0	89	0	79	10	96	3	602	51
1999	18	2	37	0	60	0	44	7	72	5	59	0	85	1	37	0	418	16
2000	37	Closed	54	Closed	66	Closed	Closed	45	120	Closed	96	Closed	46	Closed	Closed	22	419	67
2001	52	Closed	23	Closed	36	Closed	Closed	79	44	Closed	88	Closed	129	Closed	Closed	22	372	101
2002	75	Closed	81	Closed	53	Closed	Closed	87	260	Closed	6	Closed	52	Closed	Closed	38	527	125
2003	108	Closed	51	Closed	74	Closed	Closed	58	203	Closed	*	Closed	153	Closed	Closed	7	589	65
2004	Closed	4	69	Closed	64	Closed	Closed	33	617	Closed	*	Closed	258	Closed	Closed	4	1,008	37
2005	106	Closed	173	Closed	136	Closed	167	Closed	Closed	28	Closed	15	247	Closed	Closed	37	830	88
2006	225	Closed	10	Closed	57	Closed	185	Closed	Closed	0	Closed	0	202	Closed	Closed	0	688	0
2007	144	Closed	144	Closed	75	Closed	Closed	0	224	Closed	Closed	0	9	Closed	Closed	0	597	0
Averages[b]																		
1997-2006	72	13	56	3	61	11	123	40	180	7	77	8	136	6	70	20	596	74
2002-2006	128	4	77	-	77	-	176	59	360	14	6	7	183	-	-	17	728	63
2005-2007	158	-	109	-	89	-	176	0	224	14	-	5	153	-	-	12	705	29

[a] Totals may include harvests from minor section that are not on table.

[b] Years in which sections were closed are not included in averages.

* The Inner and Outer Kiliuda Bays sections were combined and managed as a single section during the 2003 and 2004 seasons. Harvests are represented in the Outer Kiliuda Bay Section.

Table 8.–Herring sac roe Guideline Harvest Levels (GHLs) in tons, for major sections in the Eastside District 1985-2007.

	East Sitkalidak		West Sitkalidak		Barling Bay		Inner Ugak Bay		Outer Ugak Bay		Inner Kiliuda Bay		Outer Kiliuda Bay[a]		Shearwater		District Totals[b]	
Year	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet
1985	60	*	expl.	*	10	*	40	*	expl.	*	10	*	expl.	*	10	*	160	*
1986	60	*	expl.	*	10	*	40	*	expl.	*	10	*	expl.	*	10	*	160	*
1987	60	*	expl.	*	10	*	40	*	expl.	*	10	*	expl.	*	10	*	150	*
1988	75	*	expl.	*	15	*	40	*	expl.	*	10	*	expl.	*	15	*	180	*
1989	95	*	expl.	*	20	*	50	*	expl.	*	10	*	expl.	*	25	*	250	*
1990	95	*	50	*	20	*	50	*	expl.	*	10	*	expl.	*	25	*	300	*
1991	95	*	65	*	20	*	50	*	expl.	*	10	*	expl.	*	25	*	315	*
1992	120	*	100	*	40	*	75	*	expl.	*	20	*	expl.	*	50	*	455	*
1993	180	*	275	*	40	*	95	*	expl.	*	60	*	expl.	*	75	*	790	*
1994	290	*	420	*	50	*	120	*	60	*	60	*	80	*	75	*	1,220	*
1995	390	*	300	*	50	*	120	*	60	*	80	*	80	*	90	*	1,265	*
1996	300	*	275	*	50	*	90	*	60	*	90	*	90	*	90	*	1,190	*
1997	200	*	100	*	50	*	90	*	60	*	90	*	90	*	90	*	900	*
1998	50	*	50	*	40	*	90	*	60	*	90	*	90	*	90	*	640	*
1999	30	*	50	*	40	*	60	*	40	*	60	*	60	*	30	*	415	*
2000	30	Closed	50	Closed	40	Closed	Closed	50	50	Closed	80	Closed	80	Closed	Closed	30	340	115
2001	40	Closed	50	Closed	40	Closed	Closed	60	50	Closed	80	Closed	80	Closed	Closed	30	350	125
2002	50	Closed	50	Closed	40	Closed	Closed	90	160	Closed	80	Closed	80	Closed	Closed	30	470	155
2003	50	Closed	50	Closed	50	Closed	Closed	110	200	Closed	[a]	Closed	200	Closed	Closed	50	560	195
2004	Closed	75	75	Closed	75	Closed	Closed	60	250	Closed	[a]	Closed	300	Closed	Closed	25	700	205
2005	100	Closed	125	Closed	75	Closed	150	Closed	Closed	100	Closed	75	200	Closed	Closed	30	650	205
2006	150	Closed	125	Closed	75	Closed	200	Closed	Closed	120	Closed	75	200	Closed	Closed	40	750	235
2007	150	Closed	125	Closed	75	Closed	Closed	150	250	Closed	Closed	75	200	Closed	Closed	40	800	265

[a] The Inner and Outer Kiliuda Bays sections were combined and managed as a single section during the 2003 and 2004 seasons.

[b] Totals may include GHLs from minor sections that are not on table.

* Sections open to both gear types with a single GHL.

expl. = Exploratory sections open to both gear types with no set GHL.

Table 9.–Herring sac roe harvests (tons) from major sections in the Alitak District 1985-2007.

	Inner Alitak Bay[a]		Outer Deadman Bay[b]		Inner Deadman Bay		North Olga Bay[c]		Upper Olga Bay		Lower Olga/Moser Bay		Sulua Bay		District Totals[d]	
Year	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet
1985	0	0	-	-	40	6	-	-	155	19	0	0	55	5	253	30
1986	0	0	-	-	42	0	-	-	157	0	Closed	Closed	30	0	208	24
1987	0	0	-	-	43	20	-	-	164	13	Closed	Closed	26	3	242	43
1988	0	0	-	-	105	0	-	-	107	85	0	0	39	9	257	97
1989	0	0	-	-	136	19	-	-	169	84	0	5	61	20	372	85
1990	0	0	-	-	143	0	-	-	161	23	0	0	62	19	366	42
1991	53	13	-	-	148	32	-	-	119	31	12	0	65	29	397	105
1992	46	36	-	-	211	9	-	-	51	56	46	36	239	35	603	172
1993	22	50	-	-	296	83	-	-	50	1	19	0	170	33	600	167
1994	100	3	117	24	205	24	0	0	89	5	12	0	226	66	767	125
1995	78	16	112	6	10	2	0	0	0	0	0	0	174	26	374	52
1996	70	9	23	1	13	1	0	0	10	0	0	2	107	181	256	194
1997	93	2	10	0	0	0	0	0	0	0	0	0	73	126	188	132
1998	58	2	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	72	2
1999	0	0	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	0	0
2000	0	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	0	0
2001	11	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	11	0
2002	35	0	Closed	Closed	Closed	Closed	Closed	Closed	Closed	0	Closed	Closed	Closed	Closed	35	0
2003	77	Closed	Closed	0	Closed	0	Closed	Closed	Closed	0	Closed	Closed	Closed	Closed	77	0
2004	52	Closed	Closed	0	Closed	0	0	0	Closed	0	Closed	Closed	Closed	Closed	52	0
2005	98	Closed	82	Closed	103	Closed	36	0	0	0	Closed	Closed	Closed	0	319	0
2006	0	Closed	79	Closed	27	Closed	48	Closed	63	Closed	Closed	0	Closed	0	216	0
2007	94	Closed	97	Closed	159	Closed	0	Closed	0	Closed	Closed	0	Closed	0	350	0
Averages[e]																
1997-2006	42	1	57	0	43	0	21	0	21	0	0	0	73	42	97	13
2002-2006	52	0	81	0	65	0	28	0	32	0	-	0	-	0	140	0
2005-2007	64	-	86	-	96	-	28	0	21	0	-	0	-	0	295	0

[a] Includes both the Inner Alitak Bay and Portage Bay sections.

[b] The Outer Deadman Bay Section was established in 1994 and included with the Inner Deadman Bay Section prior.

[c] The North Olga Bay Section was established in 1994 and included with the Upper Olga Bay section prior.

[d] Totals may include harvests from minor sections that are not on table.

[e] Years in which sections were closed are not included in averages.

Table 10.–Herring Sac Roe guideline Harvest Levels (GHLs) in tons, for major sections in the Alitak District 1985-2007.

	Inner Alitak Bay[a]		Outer Deadman Bay[b]		Inner Deadman Bay		North Olga Bay[c]		Upper Olga Bay		Lower Olga/Moser Bay		Sulua Bay		District Totals[d]	
Year	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet
1985	expl.	*	-	-	50	*	-	-	150	*	expl.	*	50	*	250	*
1986	expl.	*	-	-	50	*	-	-	150	*	Closed	*	30	*	230	*
1987	expl.	*	-	-	65	*	-	-	150	*	Closed	*	30	*	245	*
1988	expl.	*	-	-	100	*	-	-	190	*	expl.	*	40	*	330	*
1989	expl.	*	-	-	125	*	-	-	190	*	15	*	60	*	400	*
1990	expl.	*	-	-	125	*	-	-	190	*	15	*	60	*	400	*
1991	expl.	*	-	-	155	*	-	-	190	*	15	*	75	*	445	*
1992	expl.	*	-	-	195	*	-	-	145	*	15	*	95	*	460	*
1993	75	*	-	-	230	*	-	-	110	*	15	*	145	*	590	*
1994	75	*	150	*	250	*	10	*	110	*	20	*	190	*	805	*
1995	75	*	125	*	150	*	10	*	75	*	20	*	190	*	660	*
1996	75	*	95	*	40	*	10	*	40	*	15	*	240	*	530	*
1997	75	*	50	*	40	*	10	*	40	*	10	*	240	*	485	*
1998	50	*	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*	75	*
1999	50	*	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*	75	*
2000	30	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	40	15
2001	30	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	40	15
2002	30	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	10	Closed	Closed	Closed	Closed	45	20
2003	60	Closed	Closed	20	Closed	[e]	Closed	Closed	Closed	10	Closed	Closed	Closed	Closed	75	30
2004	75	Closed	Closed	20	Closed	[e]	expl.	expl.	Closed	10	Closed	Closed	Closed	Closed	75	30
2005	75	Closed	75	Closed	75	Closed	expl.	expl.	expl.	expl.	Closed	Closed	Closed	60	225	75
2006	75	Closed	75	Closed	75	Closed	50	Closed	50	Closed	Closed	50	Closed	75	325	125
2007	75	Closed	75	Closed	75	Closed	50	Closed	50	Closed	Closed	50	Closed	75	325	125

[a] Includes both the Inner Alitak Bay and Portage Bay sections.

[b] The Outer Deadman Bay Section was established in 1994 and included with the Inner Deadman Bay Section prior.

[c] The North Olga Bay Section was established in 1994 and included with the Upper Olga Bay section prior.

[d] Totals may include GHLs from minor sections that are not on table.

[e] The Inner and Outer Deadman Bay sections were managed as one section during 2003 and 2004.

* Sections open to both gear types with a single GHL.

expl. = Exploratory sections open to both gear types with no set GHL.

Table 11.–Herring sac roe harvests (tons) from major sections in the Afognak Districts 1985-2007.

	Paramanoff Bay[a]		Danger Bay		Kitoi Bay[b]		Raspberry Strait		Malina Bay		Tonki Bay		District Totals[c]	
Year	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet
1985	21	28	14	41	77	33	7	57	47	22	11	0	189	212
1986	29	10	14	19	27	8	10	41	0	14	8	0	93	117
1987	117	5	24	24	25	16	12	21	14	0	8	0	289	74
1988	41	16	7	33	25	19	40	7	50	3	17	0	197	103
1989	27	37	15	16	56	15	15	7	16	28	0	0	130	108
1990	28	35	0	5	20	19	13	29	38	0	5	2	131	122
1991	188	39	0	4	7	1	2	115	54	3	0	0	263	163
1992	478	29	0	12	1	14	64	29	101	0	0	0	721	99
1993	576	13	26	5	5	1	385	60	305	7	0	0	1,547	87
1994	437	5	0	1	0	1	190	151	257	9	0	0	884	167
1995	1,454	56	Closed	Closed	Closed	Closed	0	3	50	5	Closed	Closed	1,504	64
1996	647	172	Closed	Closed	Closed	Closed	0	4	116	2	Closed	Closed	763	181
1997	720	149	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	720	149
1998	538	15	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	0	0	538	15
1999	481	15	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	0	0	481	15
2000	423	4	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	0	423	4
2001	614	30	Closed	20	Closed	Closed	Closed	0	Closed	15	Closed	0	614	65
2002	223	20	Closed	88	Closed	Closed	Closed	Closed	Closed	2	0	Closed	223	110
2003	308	Closed	Closed	91	Closed	Closed	Closed	Closed	Closed	1	Closed	0	308	92
2004	269	Closed	Closed	74	Closed	Closed	Closed	Closed	Closed	0	43	0	312	74
2005	Closed	Closed	Closed	47	Closed	38	Closed	Closed	Closed	0	16	0	23	82
2006	Closed	Closed	181	Closed	Closed	0	Closed	Closed	Closed	0	0	Closed	181	0
2007	Closed	Closed	174	Closed	Closed	13	Closed	0	Closed	0	0	Closed	174	13
Averages[d]														
1997-2006	447	39	181	64	-	19	-	0	-	3	10	0	382	60
2002-2006	267	20	181	75	-	19	-	-	-	1	15	0	209	71
2005-2007	-	-	178	47	-	17	-	0	-	0	5	0	126	32

[a] The Paramanof Bay and Foul Bay sections have been combined and managed as one section since 2004. For comparative purposes totals are combined since 1985.

[b] The Kitoi Bay, Izhut Bay, and MacDonald's Lagoon sections have been combined and managed as one section since 2004. For comparative purposes totals are combined since 1985.

[c] Totals may include harvests from minor sections that are not on table.

[d] Years in which sections were closed are not included in averages.

Table 12.–Herring sac roe Guideline Harvest Levels (GHLs) in tons, from major sections in the Afognak Districts 1985-2007.

	Paramanoff Bay[a]		Danger Bay		Kitoi Bay[b]		Raspberry Strait		Malina Bay		Tonki Bay		District Totals[c]	
Year	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet
1985	50	*	40	*	50	*	60	*	70	*	10	*	380	*
1986	25	*	30	*	40	*	60	*	35	*	10	*	290	*
1987	25	*	30	*	40	*	60	*	15	*	10	*	270	*
1988	45	*	30	*	40	*	45	*	20	*	10	*	290	*
1989	70	*	30	*	50	*	55	*	30	*	15	*	350	*
1990	60	*	30	*	50	*	55	*	30	*	15	*	335	*
1991	60	*	20	*	50	*	110	*	30	*	15	*	380	*
1992	70	*	15	*	45	*	165	*	45	*	15	*	450	*
1993	160	*	25	*	35	*	165	*	90	*	15	*	595	*
1994	325	*	25	*	35	*	290	*	180	*	15	*	1,005	*
1995	475	*	Closed	*	Closed	*	350	*	250	*	Closed	*	1,155	*
1996	650	*	Closed	*	Closed	*	300	*	200	*	Closed	*	1,200	*
1997	800	*	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*	840	*
1998	500	*	Closed	*	Closed	*	Closed	*	Closed	*	15	*	525	*
1999	355	*	Closed	*	Closed	*	Closed	*	Closed	*	15	*	380	*
2000	350	75	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	15	350	100
2001	225	30	Closed	15	Closed	Closed	Closed	Closed	Closed	15	Closed	10	225	95
2002	250	30	Closed	30	Closed	Closed	Closed	15	Closed	15	10	Closed	260	85
2003	300	Closed	Closed	50	Closed	10	Closed	Closed	Closed	10	Closed	10	300	90
2004	300	Closed	Closed	70	Closed	10	Closed	Closed	Closed	20	expl.	expl.	300	100
2005	250	Closed	Closed	70	Closed	15	Closed	Closed	Closed	10	expl.	expl.	250	95
2006	Closed	Closed	90	Closed	Closed	40	Closed	Closed	Closed	10	20		110	50
2007	Closed	Closed	120	Closed	Closed	40	Closed	10	Closed	10	20		140	60

[a] The Paramanof and Foul Bay sections have been combined and managed as one section since 2004. For comparative purposes totals are combined since 1985

[b] The Kitoi Bay, Izhut Bay, and MacDonald's Lagoon sections have been combined and managed as one section since 2004. For comparative purposes totals are combined since 1985.

[c] Totals may include GHLs from minor sections that are not on table.

* Sections open to both gear types with a single GHL.

expl. = Exploratory sections open to both gear types with no set GHL.

Table 13.–Herring sac roe harvests (tons) from major sections within the Northeast and Inner Marmot districts 1985-2007.

	Women's Bay		Kalsin Bay		Middle Bay		Kizhuyak Bay		Northeast District Total[a]		Inner Marmot District Total[a]	
Year	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet
1985	112	34	0	4	14	0	42	23	126	38	49	51
1986	130	48	0	2	12	0	45	33	142	48	55	52
1987	0	0	16	0	82	5	51	15	117	49	64	48
1988	7	83	5	1	1	3	43	67	12	87	44	86
1989	82	27	2	3	0	4	12	111	84	34	19	111
1990	20	54	12	0	16	0	22	80	48	54	22	88
1991	68	43	6	4	15	1	20	84	89	48	23	88
1992	67	82	1	16	15	1	33	84	83	89	33	89
1993	4	26	0	0	15	1	51	16	19	27	51	17
1994	77	32	0	0	0	1	8	7	77	35	8	8
1995	9	0	0	0	0	0	5	9	9	0	5	9
1996	45	5	0	4	0	1	Closed	Closed	45	10	0	0
1997	0	1	22	0	0	0	Closed	Closed	22	1	0	0
1998	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
1999	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
2000	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
2001	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
2002	Closed	Closed	Closed	Closed	Closed	Closed	Closed	14	Closed	Closed	Closed	14
2003	Closed	7	Closed	Closed	Closed	Closed	Closed	23	Closed	7	Closed	23
2004	Closed	5	Closed	Closed	Closed	Closed	44	Closed	Closed	5	44	0
2005	Closed	25	Closed	Closed	Closed	Closed	44	Closed	Closed	25	44	0
2006	Closed	0	Closed	Closed	Closed	Closed	87	Closed	Closed	0	87	0
2007	Closed	17	Closed	Closed	Closed	Closed	Closed	6	Closed	17	Closed	6
Averages[b]												
1997-2006	0	8	22	0	0	0	58	19	22	7	44	6
2002-2006	-	9	-	-	-	-	58	19	-	9	58	7
2005-2007	-	14	-	-	-	-	66	6	-	14	66	2

[a] Totals may include harvests from minor sections that are not on table.

[b] Years in which sections were closed are not included in averages.

Table 14.–Herring sac roe Guideline Harvest Levels (GHLs) for major sections within the Northeast Kodiak and Inner Marmot districts 1985-2007.

	Women's Bay		Kalsin Bay		Middle Bay		Kizhuyak Bay		Northeast District Total[a]		Inner Marmot District Total[a]	
Year	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet	seine	gillnet
1985	90	*	30	*	10	*	60	*	140	*	130	*
1986	90	*	30	*	15	*	60	*	145	*	120	*
1987	90	*	15	*	15	*	60	*	120	*	130	*
1988	90	*	20	*	25	*	90	*	145	*	145	*
1989	110	*	20	*	25	*	110	*	165	*	160	*
1990	110	*	15	*	20	*	110	*	155	*	150	*
1991	110	*	15	*	20	*	110	*	155	*	145	*
1992	110	*	15	*	20	*	110	*	155	*	140	*
1993	110	*	15	*	20	*	100	*	155	*	130	*
1994	100	*	15	*	20	*	50	*	145	*	80	*
1995	100	*	15	*	20	*	15	*	145	*	35	*
1996	50	*	10	*	10	*	Closed	*	80	*	10	*
1997	30	*	10	*	10	*	Closed	*	60	*	10	*
1998	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*
1999	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*	Closed	*
2000	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
2001	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
2002	Closed	Closed	Closed	Closed	Closed	Closed	Closed	10	Closed	Closed	Closed	Closed
2003	Closed	10	Closed	Closed	Closed	Closed	Closed	15	Closed	10	Closed	15
2004	Closed	20	Closed	Closed	Closed	Closed	50	Closed	Closed	20	50	20
2005	Closed	20	Closed	Closed	Closed	Closed	50	Closed	Closed	20	50	25
2006	Closed	30	Closed	Closed	Closed	Closed	60	Closed	Closed	20	60	25
2007	Closed	30	Closed	Closed	Closed	Closed	Closed	60	Closed	30	Closed	60

[a] Totals may include GHLs from minor sections that are not on table.

* Sections open to both gear types with a single GHL.

Table 15.–Age composition of samples taken during the commercial sac roe fishery, by section, Kodiak Management Area, 2007.

Section	Percent at Age												
	Age-2	Age-3	Age-4	Age-5	Age-6	Age-7	Age-8	Age-9	Age-10	Age-11	Age-12	Age-13	Age-14+
Village Islands/Uganik Bays	0.0	14.6	28.8	13.7	9.5	8.5	12.3	5.1	5.6	0.6	0.3	0.2	0.2
Inner Uyak Bay[a]	0.0	14.2	37.4	22.4	11.5	4.7	2.0	2.7	4.0	0.6	0.0	0.0	0.0
Brown's Lagoon[a]	19.0	43.8	21.9	5.7	3.8	2.8	0.0	0.0	2.8	0.0	0.0	0.0	0.0
Danger Bay	0.0	17.8	28.4	11.4	18.8	11.4	6.4	0.9	2.2	0.9	0.9	0.4	0.0
Paramanof Bay[a]	88.8	9.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
East Sitkalidak Strait	0.0	0.2	1.3	6.5	83.5	6.0	0.8	0.5	0.7	0.0	0.0	0.0	0.0
West Sitkalidak Strait	0.0	0.2	2.3	5.0	81.0	6.0	2.5	1.8	0.8	0.0	0.0	0.0	0.0
Barling Bay	1.2	12.3	5.1	5.8	59.7	3.8	0.6	2.5	6.4	0.0	0.0	1.9	0.0
Outer Ugak Bay	0.7	40.0	10.8	10.5	22.4	4.7	1.7	2.7	2.7	1.0	1.5	0.7	0.0
Inner Alitak Bay	0.0	8.1	8.5	10.5	66.2	2.8	0.8	2.0	0.0	0.4	0.0	0.0	0.4
Outer Deadman Bay	0.0	4.4	8.6	8.3	69.8	3.8	1.6	0.9	0.9	0.6	0.3	0.3	0.0
Inner Deadman Bay	0.0	6.9	12.3	6.4	71.7	0.4	0.9	0.0	0.4	0.0	0.0	0.4	0.0
All Samples combined	2.9	11.8	13.4	9.4	46.7	5.7	4.0	2.1	2.4	0.4	0.3	0.2	0.0

[a] No harvest occurred in these sections.

Table 16.–Average weight, in grams, by age class of herring samples taken during the commercial sac roe fishery by section, Kodiak Management Area, 2007.

Section	Average Weight at Age in Grams												
	Age-2	Age-3	Age-4	Age-5	Age-6	Age-7	Age-8	Age-9	Age-10	Age-11	Age-12	Age-13	Age-14+
Village Islands/Uganik Bays	-	94	135	171	200	223	229	251	257	274	292	312	286
Inner Uyak Bay[a]	-	92	139	168		189	-	-	-	-	-	-	-
Brown's Lagoon[a]	35	84	120	148	168	208	-	-	237	-	-	-	-
Danger Bay	-	106	149	198	221	244	253	306	307	336	336	323	
Paramanof Bay[a]	33	61	98	-	-	-	-	-	-	-	-	-	-
East Sitkalidak Strait	-	116	161	205	228	262	257	286	312	-	-	-	-
West Sitkalidak Strait	-	105	158	199	227	256	265	304	321	-	-	-	-
Barling Bay	74	106	165	194	225	269	243	301	316	-	-	360	-
Outer Ugak Bay	69	99	142	174	221	241	265	299	302	304	300	315	-
Inner Alitak Bay	-	117	166	211	241	267	257	332	-	350	-	-	371
Outer Deadman Bay	-	104	172	209	244	261	287	335	306	401	371	360	-
Inner Deadman Bay	-	109	154	196	234	260	285	-	264	-	-	419	-

[a] No harvest occurred in these sections.

Table 17.–Herring food and bait commercial fishery harvest, Kodiak Management Area, 1912-2007.

Year	Tons	Year	Tons	Year	Tons
1912	20	1944	26,835	1976	No data
1913	0	1945	31,114	1977	No data
1914	0	1946	47,506	1978	399
1915	0	1947	50,743	1979	125
1916	70	1948	46,428	1980	381
1917	138	1949	0	1981	18
1918	118	1950	44,133	1982	326
1919	260	1951	4,299	1983	33
1920	46	1952	1,389	1984	123
1921	945	1953	725	1985	102
1922	1,483	1954	0	1986	213
1923	322	1955	0	1987	217
1924	4,823	1956	13,524	1988	340
1925	9,997	1957	21,219	1989	345
1926	2,681	1958	1,711	1990	313
1927	2,593	1959	3,831	1991	215
1928	625	1960	0	1992	312
1929	No data	1961	0	1993	784
1930	622	1962	0	1994	677
1931	1,000	1963	0	1995	507
1932	3,594	1964	310	1996	651
1933	2,313	1965	35	1997	756
1934	60,000	1966	198	1998	151
1935	No data	1967	300	1999	Closed
1936	24,748	1968	15	2000	Closed
1937	27,659	1969	11	2001	115
1938	24,522	1970	8	2002	135
1939	38,601	1971	44	2003	199
1940	22,677	1972	50	2004	190
1941	40,084	1973	178	2005	168
1942	16,791	1974	40	2006	169
1943	35,352	1975	5	2007[a]	-
Averages[b]					
1997-2006	235				
2002-2006	172				
2005-2007	169				

[a] Harvest Information for 2007 will not be available until the fishery closes on February 28, 2007.

[b] Years in which sections were closed are not included in averages.

Table 18.–Subsistence herring harvest summary for the Kodiak Management Area, 1991-2007.

Year	Permits Issued	Permits Returned	Estimated Harvest in Pounds by District							
			Afognak	Northeast	Inner Marmot	Uganik	Uyak	Eastside	Alitak	Total
1991	50	9	2,110	1,745	1,745	1,000	0	0	0	6,600
1992	45	10	120	250	250	1,000	0	0	320	1,940
1993	50	16	90	3,000	3,910	550	50	0	0	7,600
1994	47	14	90	740	1,350	2,000	200	0	0	4,380
1995	20	6	75	0	500	0	340	0	175	1,090
1996	23	10	550	180	140	0	590	0	0	1,460
1997	16	7	0	200	350	50	1,325	0	0	1,925
1998	18	10	1,240	0	0	50	0	0	0	1,290
1999	15	9	0	200	350	0	425	0	0	975
2000	39	21	575	21,150	0	1,825	0	0	700	24,250
2001	48	19	3,000	0	875	0	1,015	10,500	0	15,390
2002	[a]	23	1,170	1,150	420	0	200	903	0	3,843
2003	[a]	16	0	220	300	0	420	1,210	30	2,180
2004	[a]	22	200	780	450	206	1,570	942	0	4,148
2005	[a]	37	300	995	920	160	550	2,255	155	5,335
2006	[a]	30	200	1,170	1,040	250	265	1,610	0	4,535
2007 [b]	[a]	-	-	-	-	-	-	-	-	-

[a] Beginning in 2002, herring was added to the Kodiak subsistence salmon and crab permit; no separate permit was required.

[b] 2007 subsistence harvests will not be available until the majority of subsistence permits are returned in March of 2008.

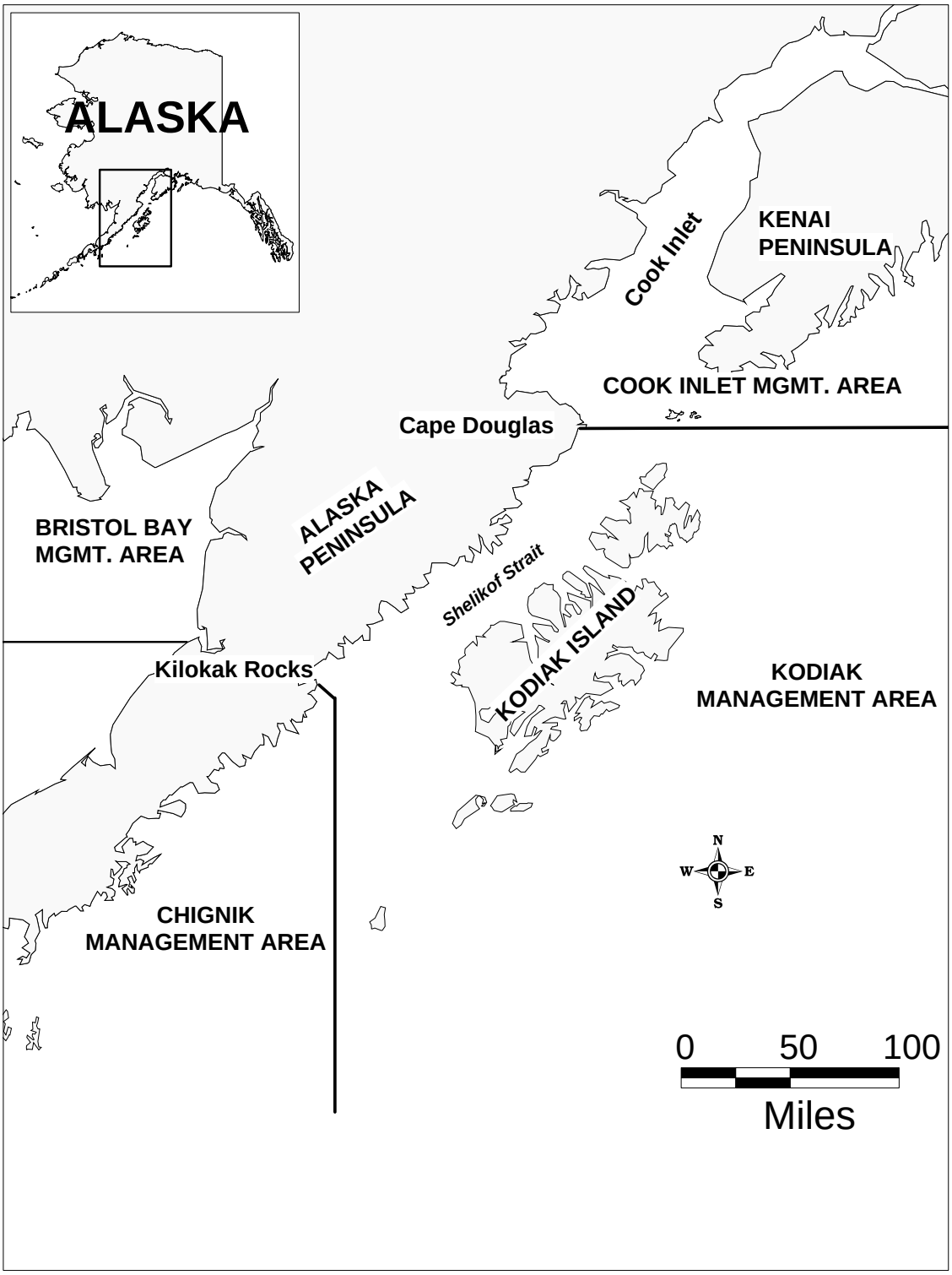

Figure 1.–Map of southwestern Alaska emphasizing the Kodiak Management Area and its relationship to surrounding management areas.

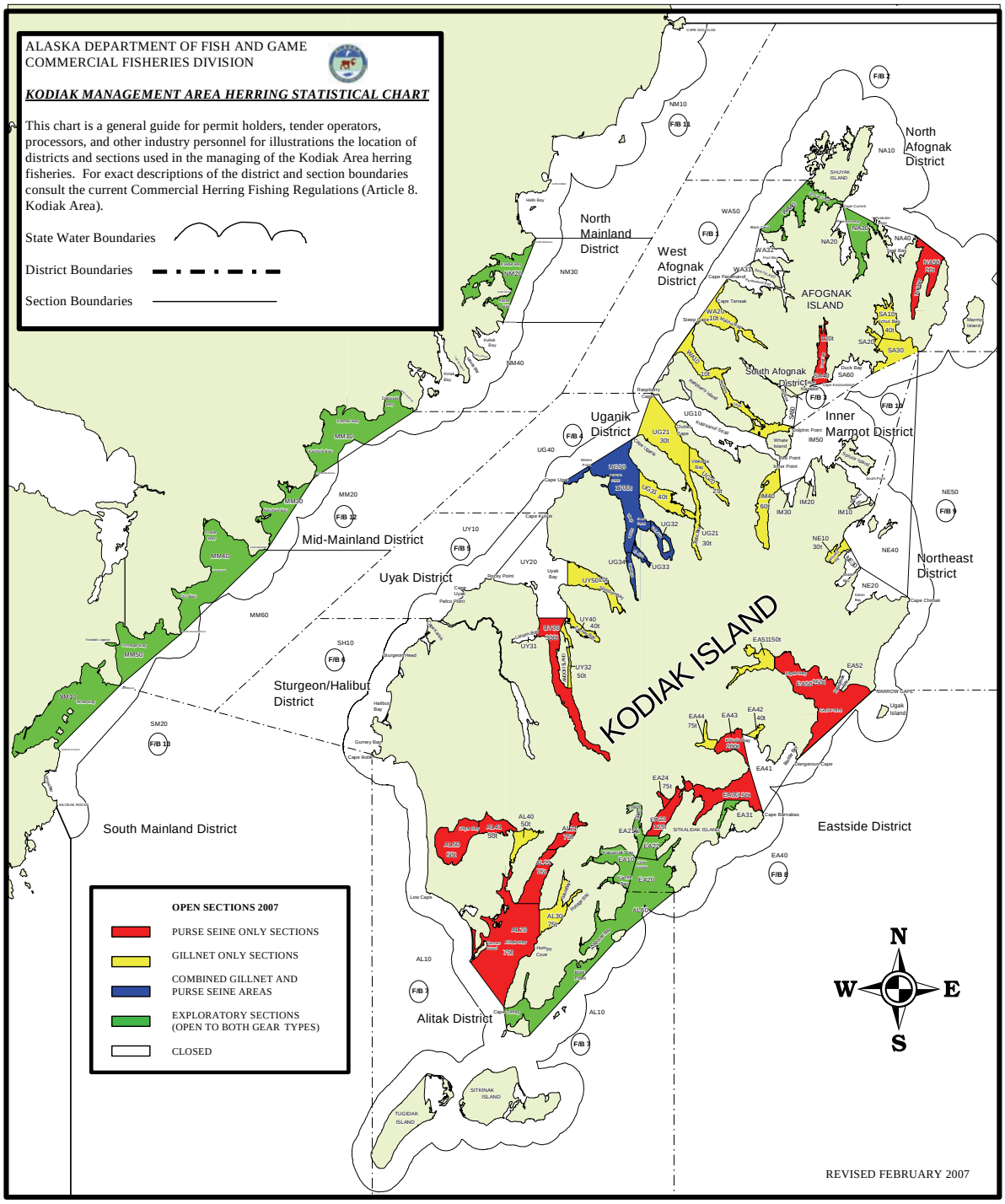

Figure 2.–Map of the Kodiak Management Area illustrating the commercial herring fishery districts.

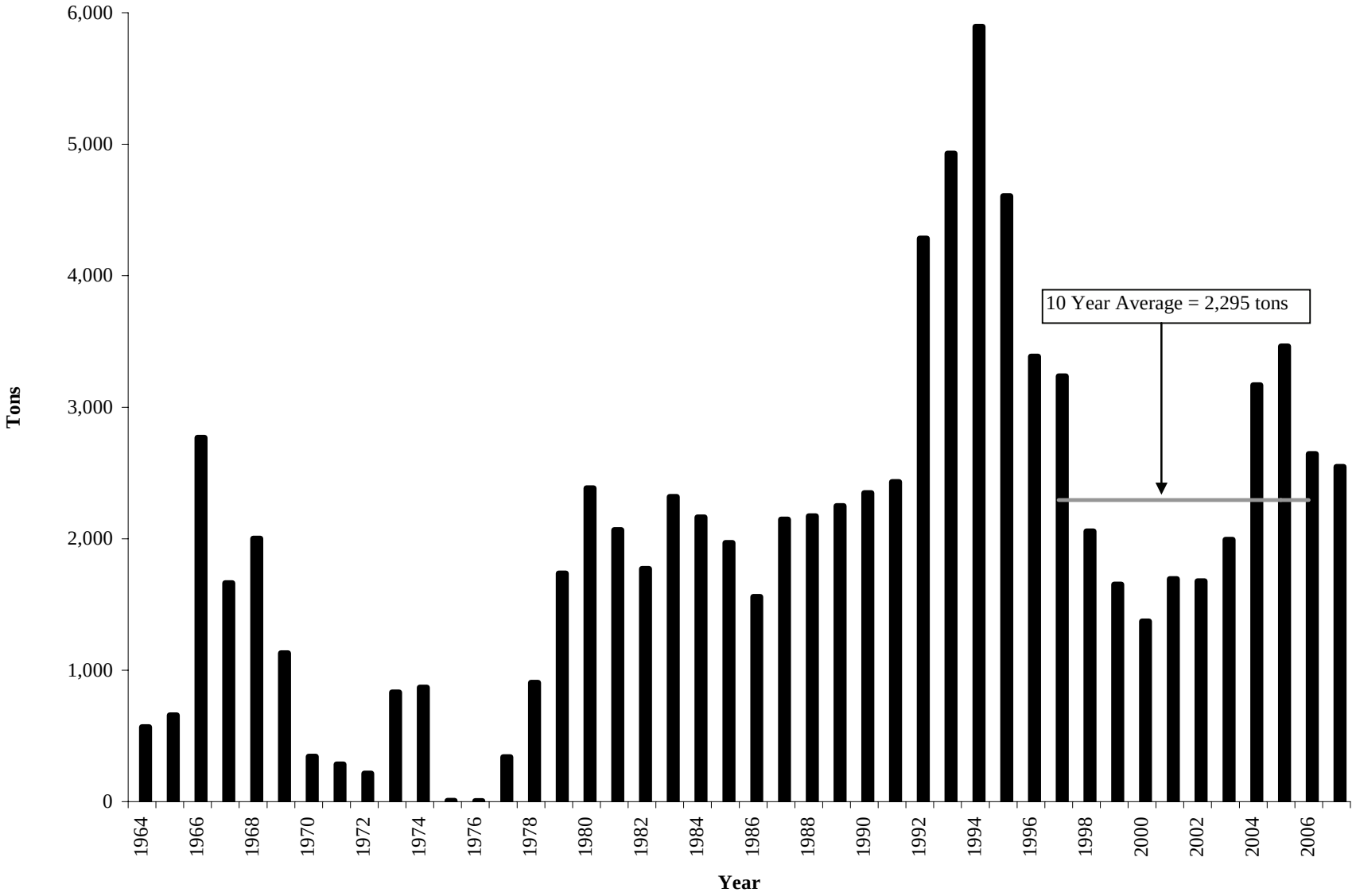

Figure 3.–Herring sac roe commercial fishery harvest, Kodiak Management Area, 1964 to 2007.

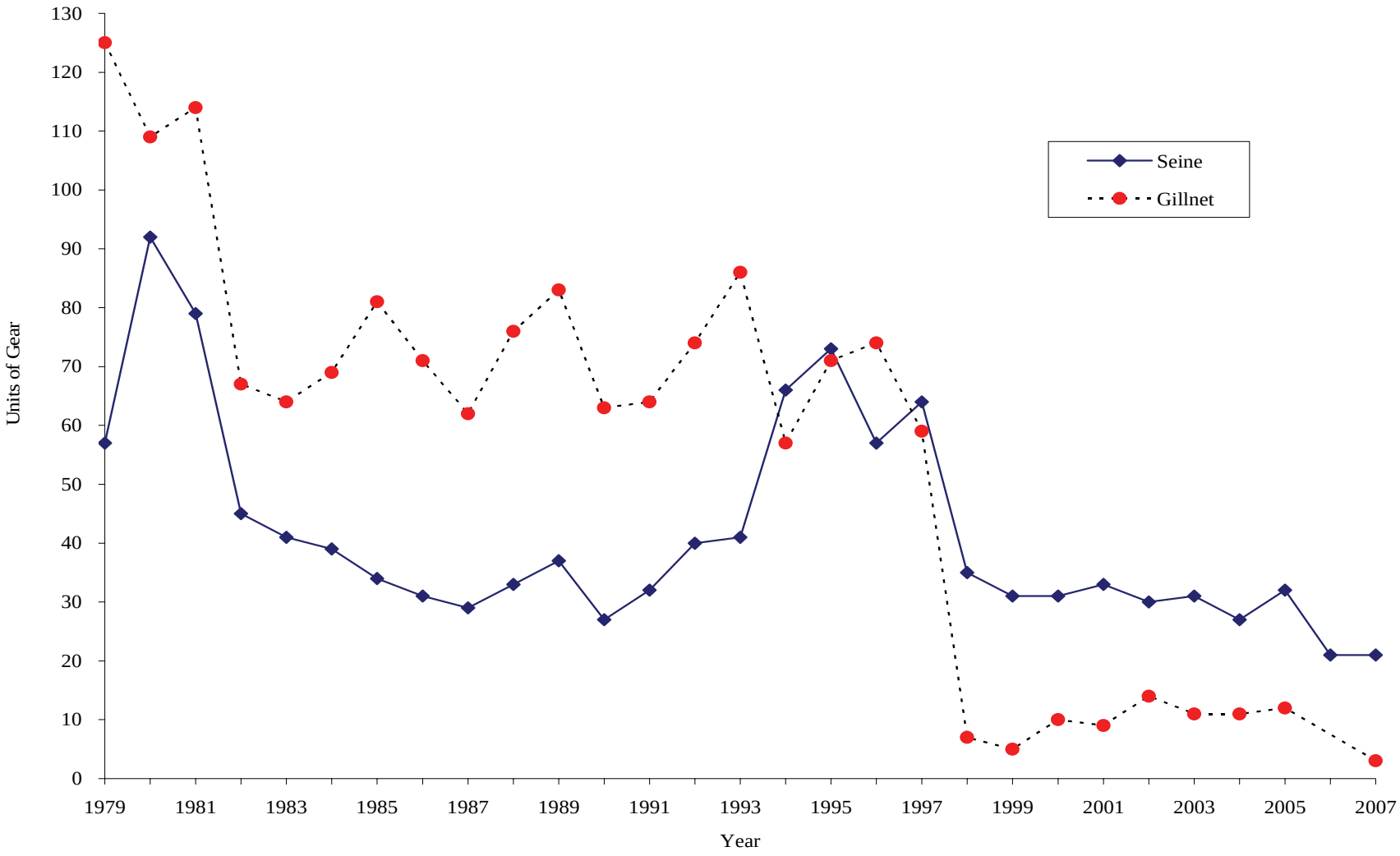

Figure 4.–Herring sac roe commercial fishery participation, Kodiak Management Area, 1979 to 2007.

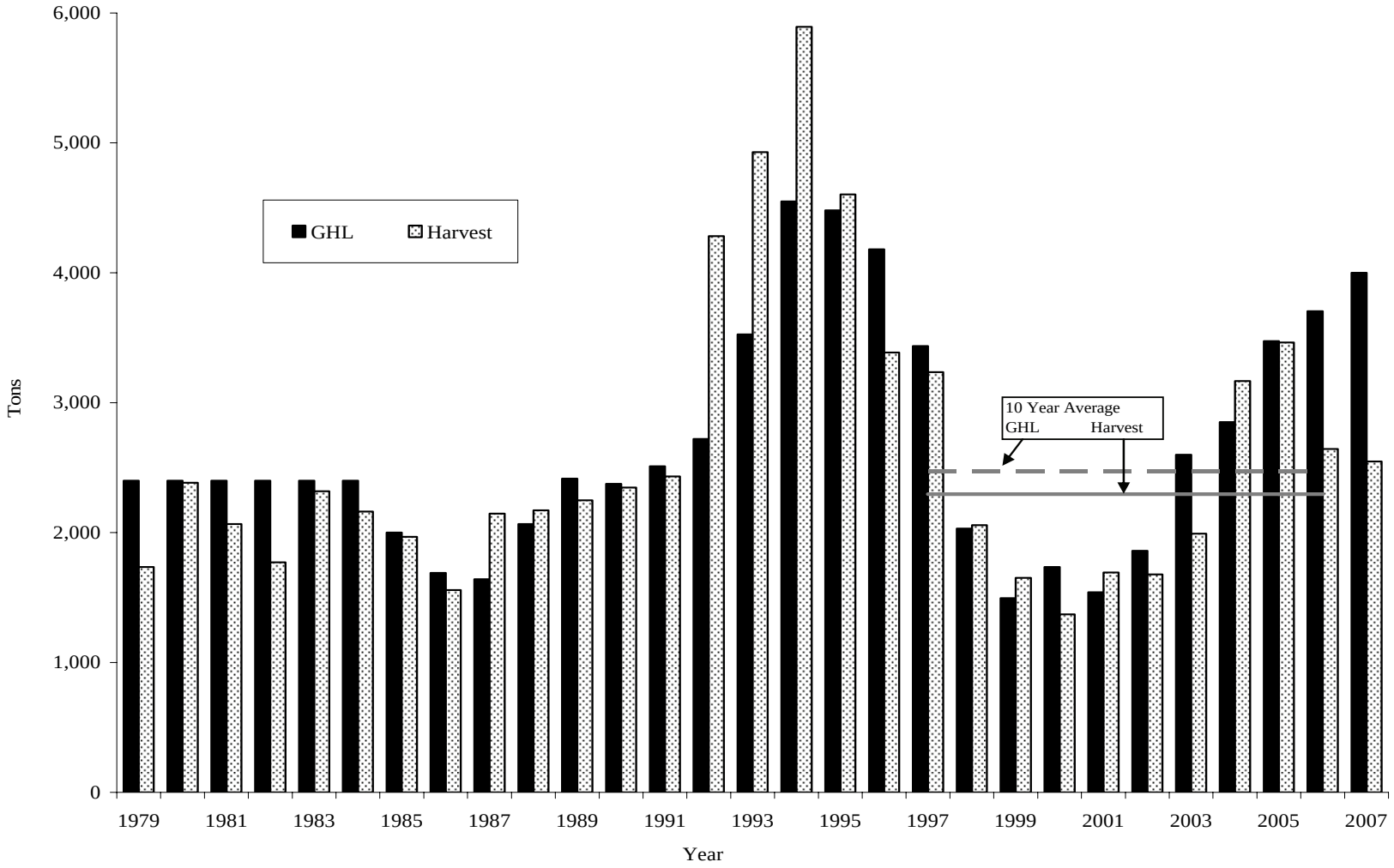

Figure 5.–Comparison of guideline harvest levels (GHLs) to the herring sac roe commercial harvest, Kodiak Management Area, 1979 to 2007.

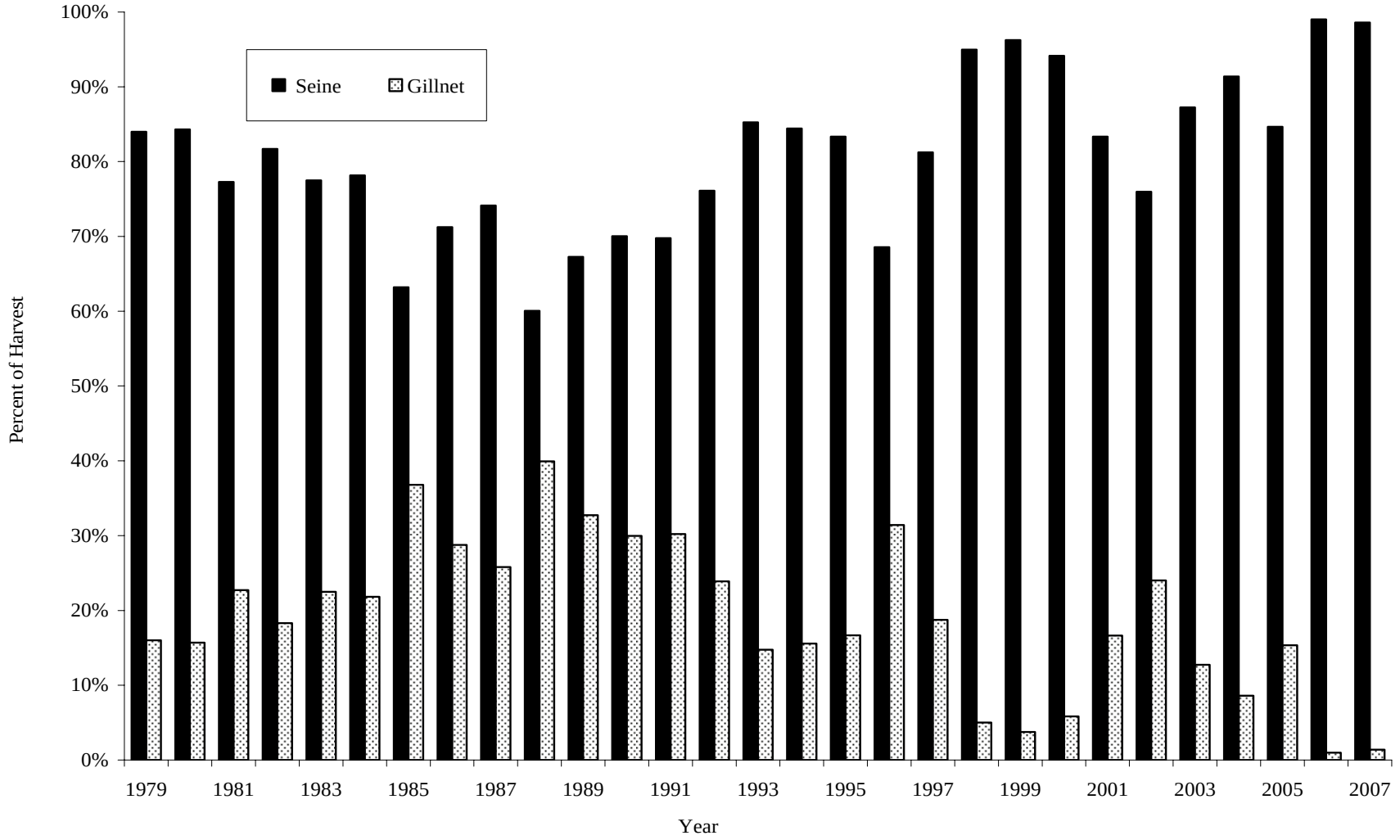

Figure 6.–Percent of the total harvest taken by gear type in herring sac roe commercial fisheries, Kodiak Management Area, 1979 to 2007.

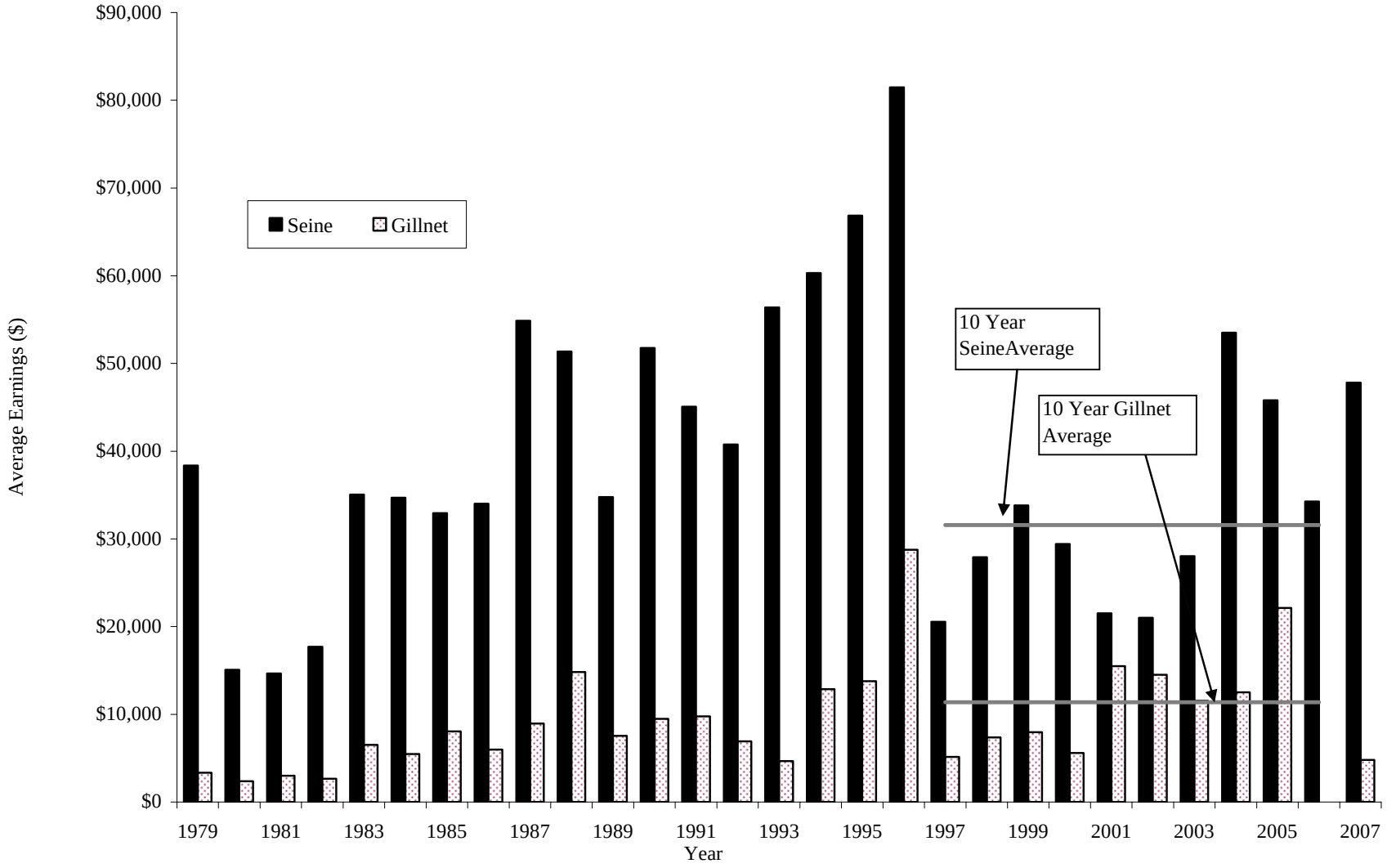

Figure 7.–Average exvessel value by gear type for herring sac roe commercial fisheries, Kodiak Management Area, 1979 to 2007.

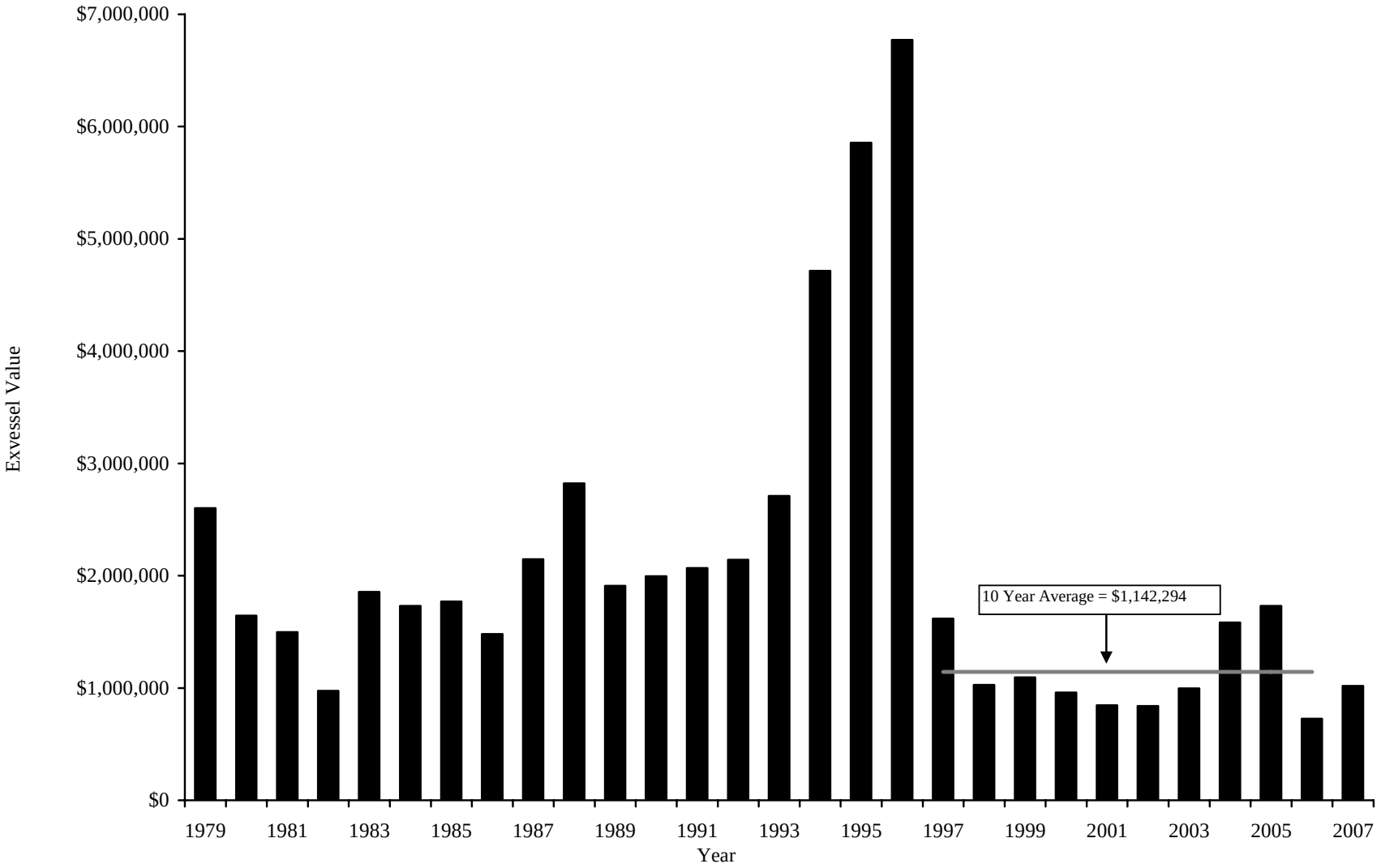

Figure 8.–Total exvessel value for herring sac roe commercial fisheries, Kodiak Management Area, 1979 to 2007.

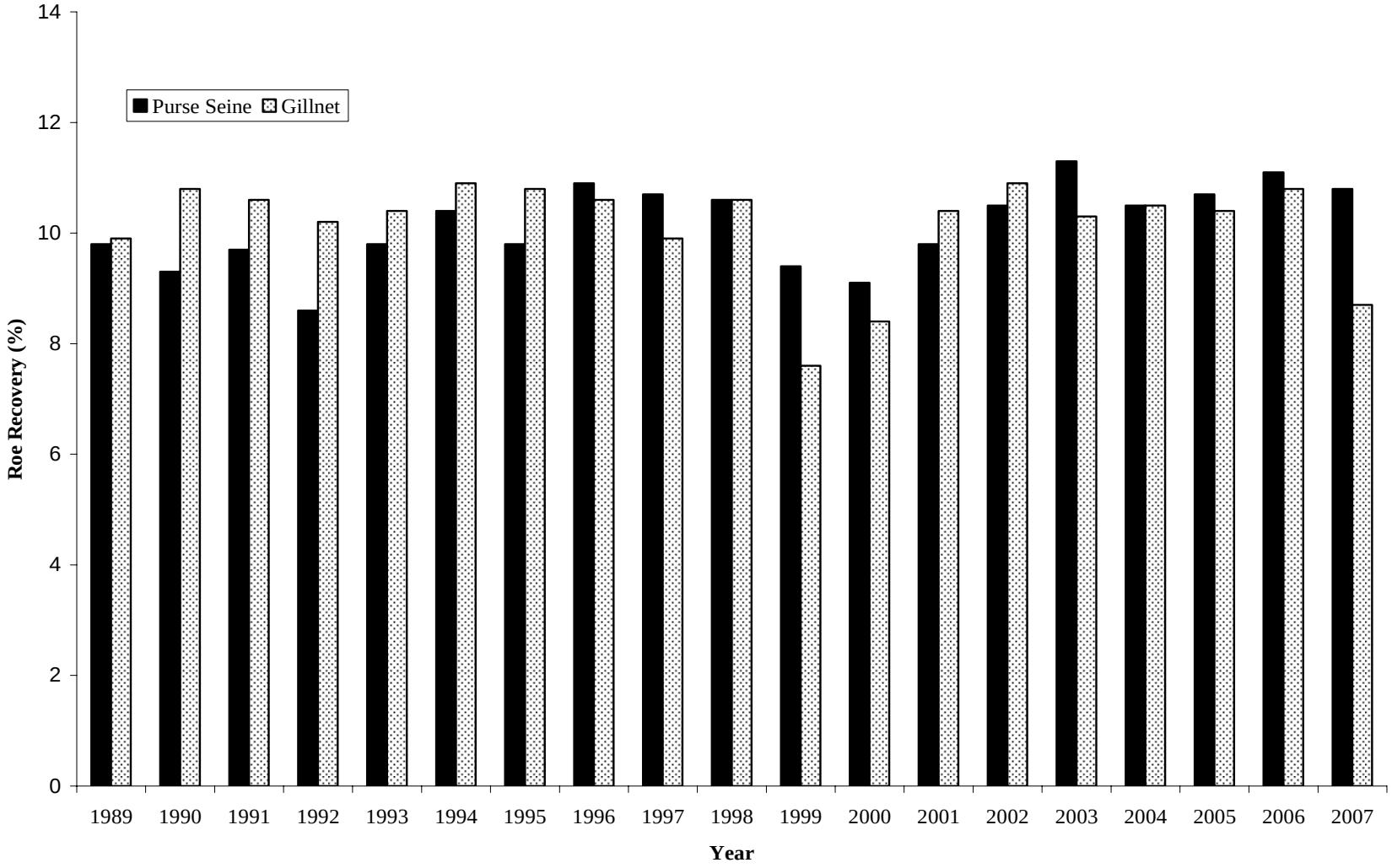

Figure 9.–Herring sac roe fishery, roe recovery, Kodiak Management Area, 1989-2007.

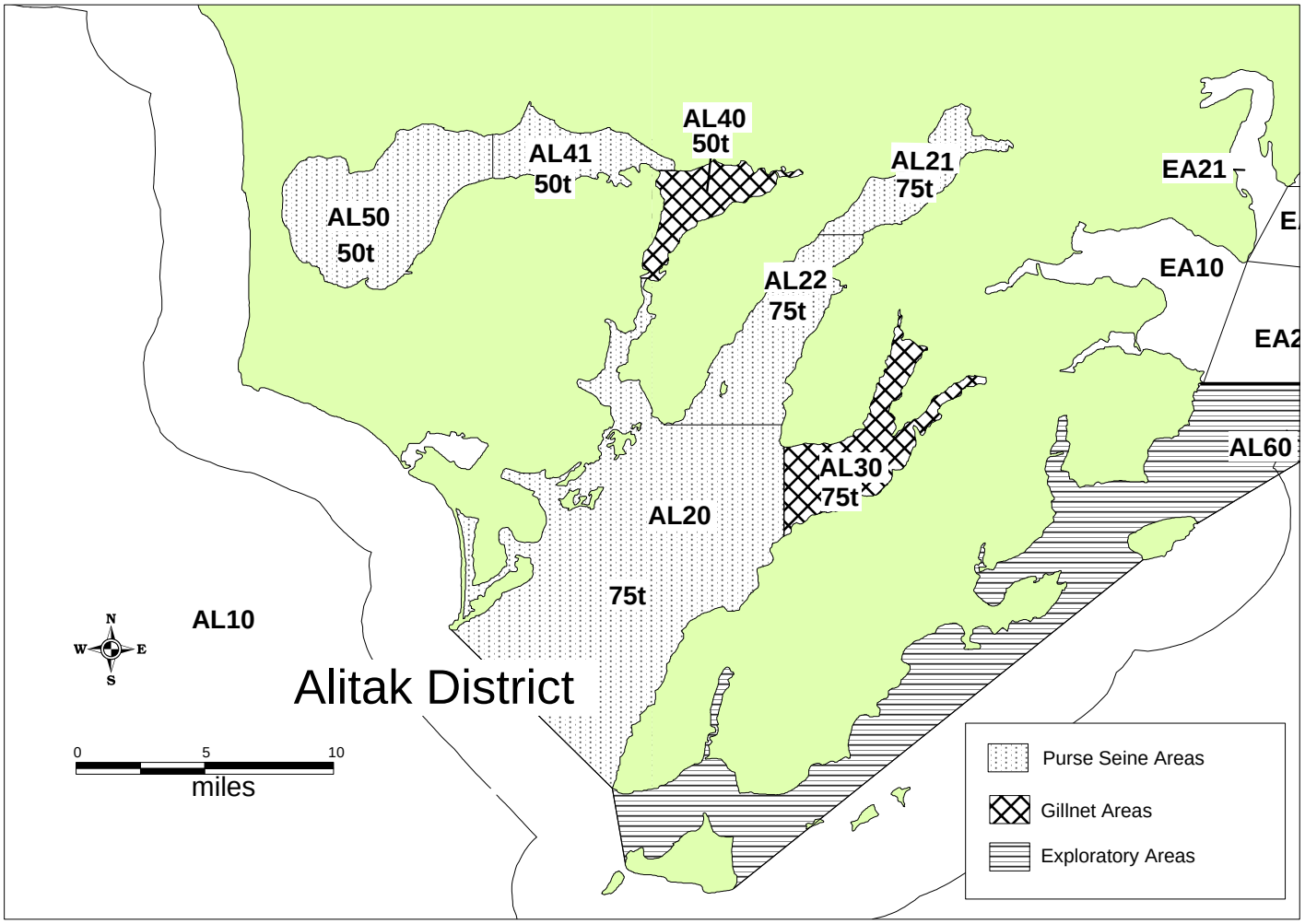

Figure 10.–Map showing the boundary lines in effect for the Alitak District in 2007.

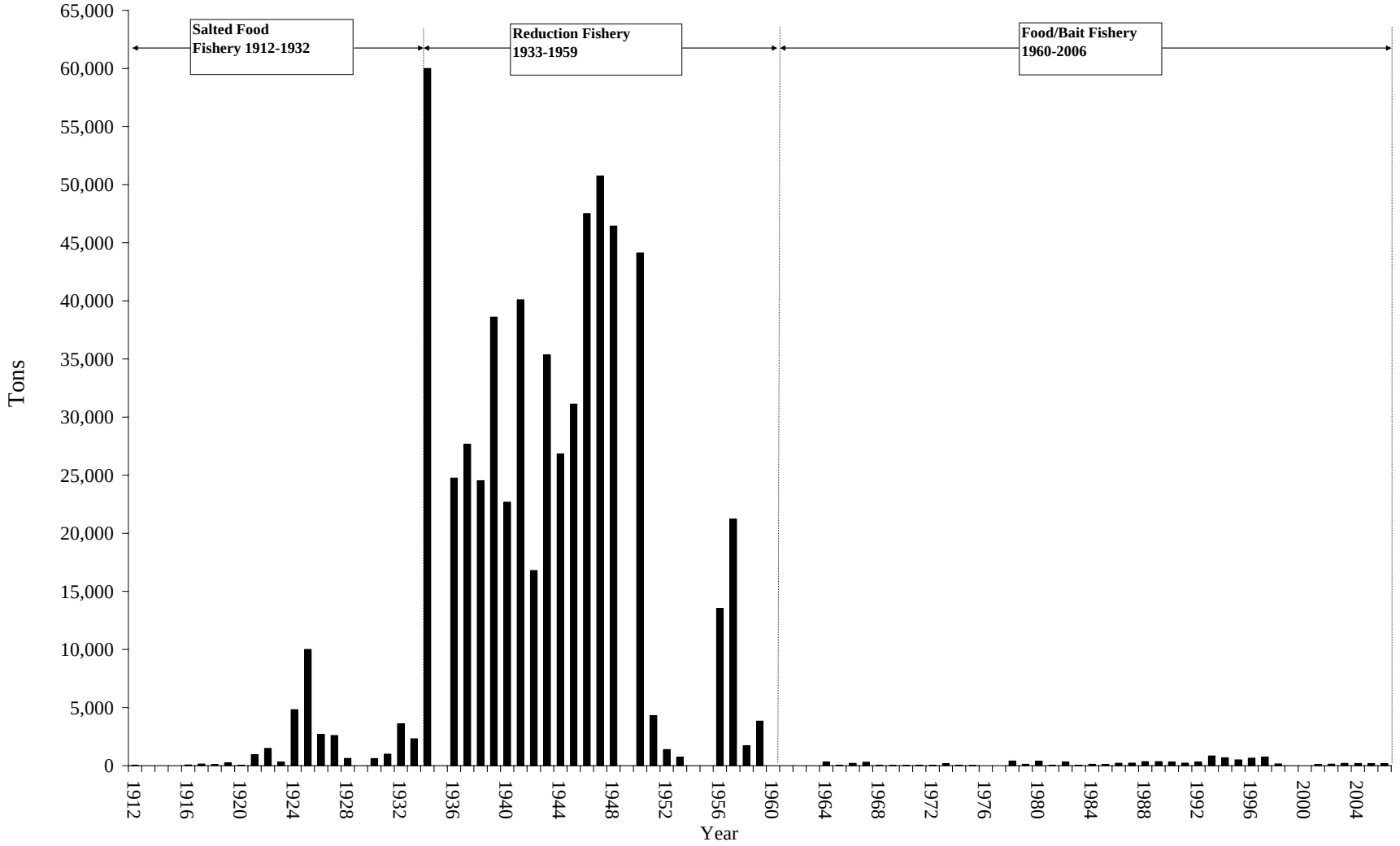

Figure 11.–Herring food and bait commercial fishery harvest, Kodiak Management Area, 1912 to 2006.